

CREATE YOUR OWN CROSSWORDS







News

All that's new in the ever expanding world of the Electron.



Graphics

In which we join the invisible text and graphics cursors and say hello to VDU5. 10

Software Surgery

The very latest software releases: Commonwealth Games, Drag Racing, Psycastria and Myorem - they're all here.

Basics

Our helpful hints for new programmers move on to the keywords PRINT and LET.



Maths Fun

Your powers of mental arithmetic are put to the test in this instructive program.

16

Bug Hunt

More hints to help you to cure your sick listings: Using REM and the GET command. 23

BOS

Take the tedium out of those debugging sessions with this on-screen editor for Basic programs. 28

Crossword

Two routines for crossword lovers - a designer to create your own and an on-screen aid to solving them. 34

Beginners

The mysteries of procedures are unravelled as we look at passing parameters.

39

10 Liner

A brief but effective program to make your Electron etch-a-sketch.



Rat Catcher

You'll need quick thinking and nimble fingers in this fast action game.

Hardware Review

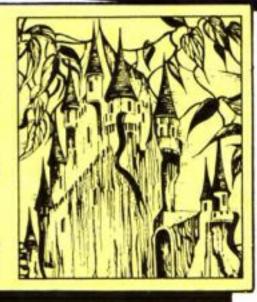
Need more ram on your Electron? The PMS 6502 second processor might be 55 the answer.

Merlin's Cave

More hints and tips for adventurers including a Citadel special - from our resident wizard. 58

Micro Messages

The pages you write yourselves. A selection from the many interesting letters you've been sending us over the last few weeks. 47



Bargains galore!

Don't miss our special offers on Pages 50 to 53.

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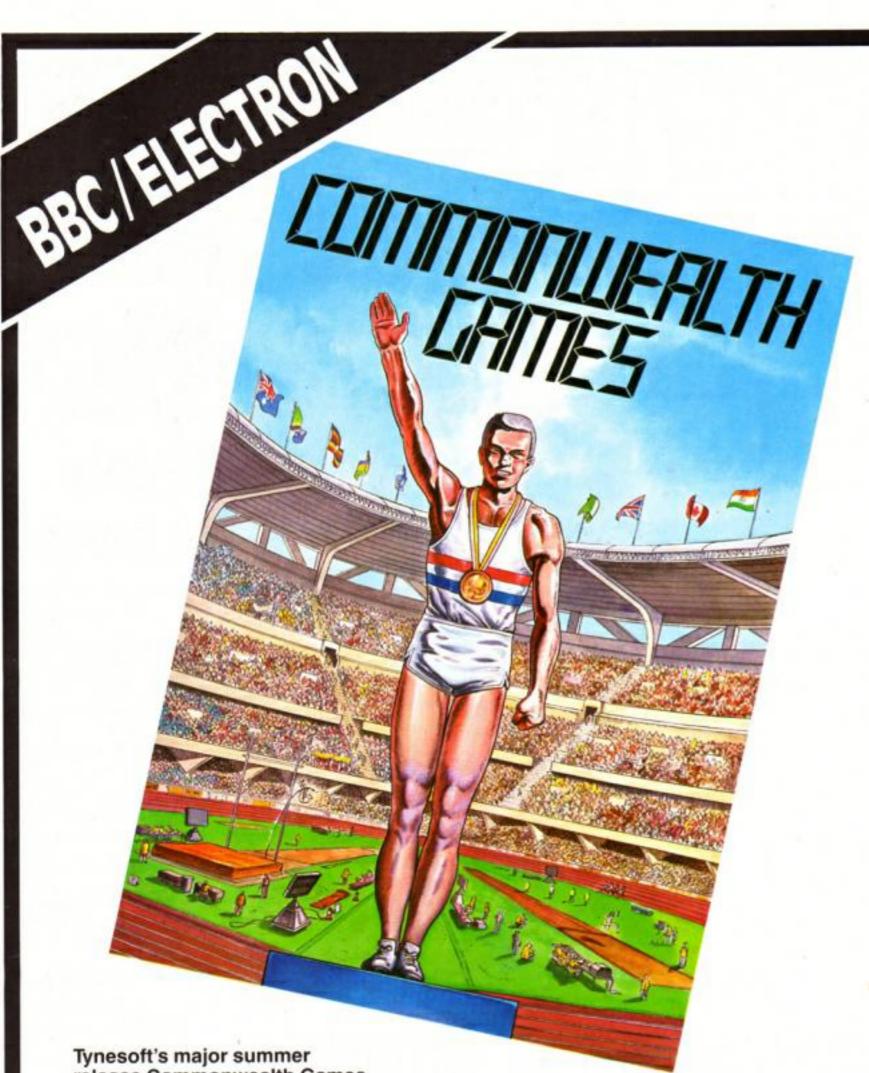
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Super Xmas Show

THE Show that broke all existing records in the spring is set to repeat the performance when it returns to the Royal Horticultural Hall, Westminster next month.

Pre-Christmas bargains and exciting new products will fill well in excess of 100 stands at the Electron & BBC Micro User Show from Friday to Sunday, November 7, 8 and 9.

All the major producers of software and peripherals for the Electron will be there again, their enthusiasm fuelled by the tremendous success of the spring show.

It is anticipated that more than half the exhibitors will be bringing with them new products and cut-price offers specifically for Electron owners.

ENTER THE COMPACT

THE new big brother for the Electron has duly been delivered by Acorn.

Named the Compact - not the Baby as had been originally forecast - it boasts I28k and a built-in 3.5in disc drive.

By endorsing the smaller disc format, Acorn has opened up new software horizons for Electron disc users in that it will result in a vast range of titles being made available.

It is being offered in three configurations.

Electron's big brother lacks one golden touch

The basic model carries a price tag of £399, bundled with a monochrome monitor it costs £469, and for a colour system the price is £599. All three packages include sophisticated software worth in the region of £150.

Acorn is known to be

relying on its name for quality to carry it through in what is becoming an increasingly competitive marketplace.

"Our market research has shown that quality is very important to the customer," Jeremy Preston, Acorn's marketing communications manager, told Electron User.

"We would like to see Electron users view this as their next logical step up in the market".

The Compact to date has been well received by the reviewers.

However, one expert has noted that it lags least one specification.

Mike Cook, technical editor of The Micro User, was quick to point this out in his literary dissection of the Compact.

Examining the printed edge connector intended for further expansion, he wrote:

"This expansion method has been used on many other computers before but only once on an Acorn product - the Electron.

"On the Electron, however, the edge connector was gold plated a valuable move in my opinion.

Problems

"Unfortunately the Compact's is only tinned.

"I know from my own personal experience that this can lead to reliability problems with whatever is plugged onto the connector due to oxidation of the tinning. This can be cured simply by unplugging the connector and wiping it with a solvent but gold plating circumvents the problem".

He later said: "It just goes to show that even a relatively much more expensive machine like the Compact still can learn a thing or two from the Electron".

Off to a good start

A LEADING supplier to the Acorn market insists that more than 40,000 Compacts had been sold before the official launch.

Nazir Jessa of Watford Electronics claims that the information comes from "a completely reliable source".

He told Electron User: "I have no doubt that Acorn has already sold more than 40,000 - many to Europe - it's that good a micro".

behind the Electron in at

NEW LINK TO US DATABASE

MICROLINK has achieved a world first by creating a permanent electronic link across the Atlantic.

It will allow owners of Electrons and other micros to log on in a matter of seconds to one of the most dynamic databases in the USA.

And the cost will be approximately half that of a conventional transatlantic telephone call.

The breakthrough

has come about as a result of a deal struck between MicroLink and Mnematics, based at Sparkill, New York.

With the help of its US partner, MicroLink has set up a complex electronic gateway which will enable the exchange of messages between micros in the US and the UK.

The new service was officially opened when Derek Meakin, head of MicroLink, sent the first message to his opposite number at Mnematics, Gregg Squires.

Seated at the keyboard in his office in Stockport, he simply typed the letters MNE. Without any delay a welcome message from New York appeared on his screen. Then he typed: "Dear Gregg - This is a historic moment . . . the opening of the firstever transatlantic gateway to enable micro users in the UK to talk to

their fellow enthusiasts in the USA.

"On behalf of many thousands of MicroLink subscribers in the UK, together with many others who have joined us from countries all round the world, I send greetings to you and everyone at Mnematics.

"From now on we're all going to have lots to talk about".

The UK-USA com-

Turn to Page 6

NEW ELECTRON PRODUCTS IN LINE FOR NORTHERN SHOW

MOST of the manufacturers and suppliers exhibiting at the Electron & BBC Micro User Show at UMIST, Manchester, have confirmed that they will be bringing with them a host of new products and bargains galore.

And there will be no shortage of exciting hardware and software developments designed for the massive Electron user base.

Although the spotlight will tend to shine on Acorn's new machines, the Compact and the M19, the great Northern showcase will feature plenty to interest the increasingly sophisticated Electron owner.

Permanent Memory Systems has produced what it calls "the ultimate add-on for the Electron", the E2P 6502 Second Processor.

It claims a 300 per cent speed increase in Basic Mode 0, 3½ times more test storage in View Mode 3, and 30k Basic programs in all modes.

Basic and View have 45k of usable memory and 60k is available for machine code programs and data.

The E2P 6502 plugs into a Plus 1 slot, "runs

Acornsoft creative graphics at BBC speed", runs BBC rom-based languages from disc or tape, and works with the Slogger turbo. Price: £89.

Also new from PMS is the Multi-Font NLQ printer driver – rom based software for Electron owners with Epson RX/FX compatible printers – which will be sold at a special show price of £29.95.

Meedmore will be unveiling Whisker, its new analogue mouse which comes with drawing and painting software, costs £39.95, and can be used with AMX and Bitstik programs.

The new AP4 disc interface from Advanced Computer Products opens up the Electron to a vast pool of software previously restricted to the BBC Micro.

It features a 1770 DFS as standard, running with Page at & E00, and costs £69.95.

There should also be a chance to see the AP5 which effectively adds three more interfaces to the Electron. It combines a 1MHz bus – providing the same I/O as that on the BBC Micro – and a Tube interface for about £50.

The company has

also produced a user port for connections to the AMX Mouse and CAD/CAM applications.

Care Electronics is launching its Electron rom extension cartridges for use with word processing chips and toolkits, and will be selling them at special show prices.

On the entertainment front there will be the chance to buy all the new titles published for the Christmas season, along with many cutprice offers on existing games.

Tynesoft is launching Futureshock, a multiscreen arcade adventure for the Electron, and offering several recent releases at special show prices.

Shards Software is releasing its new spy adventure Operation Safras, a seguel to the

Rock at the theatre

THE most entertaining sessions in the Acorn Theatre at the Manchester Electron & BBC Micro User Show are likely to be those featuring Chart Challenge, a new quiz game package for the Electron, based on rock and pop music.

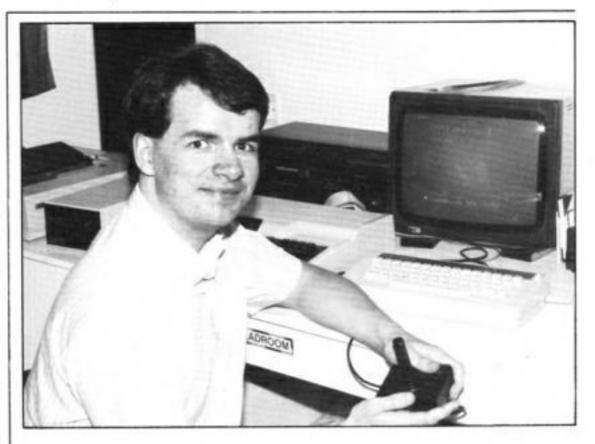
Published by Outlook Enterprises, Chart Challenge is a set of programs providing four different quiz games on a 700k database with more than 60,000 questions and answers.

It covers every record that has ever been a top 75 hit in the UK, and visitors to the Acorn Theatre will be able to test their knowledge of the rock and pop scene by playing Chart Challenge each afternoon between 2pm and 3pm.

popular Pettigrew's Diary, on cassette at a special introductory price.

In addition there will be the Acorn Theatre, where each day leading experts will be describing all the latest developments at Cambridge.

The show is open 10am to 6pm Friday and Saturday, September 26 and 27, and 10am to 4pm Sunday September 28, at the Renold Building, UMIST.



From Page 5

puter link opens up a host of new services for subscribers to Micro-Link.

They will be able to choose from playing realtime games to participating in the activities of more than 40 special interest groups.

And with Associated Press providing a 24 hour global news service, there will be instant access to news.

"We are just delighted that we at MicroLink are able to offer this first", says Derek Meakin. "It's going to transform the way we communicate with the States".

Now Gregg Squires hopes to open a reverse link — to allow micro users in the USA to share all the facilities of MicroLink. A FORMER member of the Electron User editorial team has written what is being described as "the ultimate shootem-up game".

Kevin Edwards is the author of Galaforce for the Electron, the first

Shooting ahead

title offered under the Superior Software/ Acornsoft label.

"Following negotiations between Superior and Acornsoft, this is the first release to bear the joint logo," says general manager Steve Botterill.

"We confidently expect Galaforce to be a bestseller".

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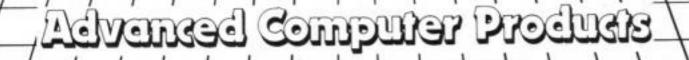
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ELECTRON USER, JUNE '86

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"The AP4 should be considered the standard interface for the Electron". Acorn User, July '86

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(3 1/2" ADFS disc + manual)

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BY now you should be completely familiar with text and graphics windows. Somewhere deep inside your brain should lodge the knowledge that:

VDU 28,bottomx,bottomy, topx,topy

defines a rectangular part of the screen in which all printed text is confined.

Not content with this, last time we also dealt with the subject of graphics windows. Again we used a VDU command to create them, but this time it was VDU 24. We saw that the format was:

VDU 24,bottomx;bottomy; topx;topy;

and that the numbers following the VDU 24 are graphics coordinates. Make sure you get the semicolons correct as wrong punctuation in a VDU command can have weird results.

While we've been dealing with the two kinds of windows have you noticed that we've also mentioned two kinds of cursor? There's the text cursor and the graphics cursor.

The text cursor is the annoying flashing line that shows where the next text character is going to appear. It's the thing that we switch off with:

VDU 23,1,0;0;0;0;0;

On the trail of that invisible graphics cursor

Part eight of the Electron graphics series by TREVOR ROBERTS

and back on again with:

VDU 23,1,1:0:0:0:

Also we can position the text cursor anywhere on the screen using the TAB command, measuring in terms of character spaces and rows from the top left corner of the display or the top left of a text window if one is defined.

The graphics cursor is a completely different beast. For a start we can't see it, it's invisible.

However we know that it's there – we've too often seen the effect that MOVE and DRAW have on it to have any doubts.

The shy creature can be positioned using MOVE fol-

lowed by the appropriate graphics coordinates, measured from the bottom left corner of the display.

And even if there's a graphics window in force the graphics cursor still positions itself with reference to the bottom corner of the screen rather than to that of any window.

Table I sums up the differences between them, while Figure I shows the coordinate systems used to control them in Mode 5.

It's easy to see why there are two different types of cursor. The text cursor works on the text screen showing where text will go.

However the graphics cursor is confined to the graphics screen and shows where MOVE, DRAW and the other graphics commands will operate.

It makes sense that such very different screens should each have its own type of cursor. So it may come as some surprise when I inform you that at times it's very useful to be able to join the two.

In fact there's a specific VDU command, VDU 5, to do just that job. Put the Electron into a graphics mode with, say:

MODE 5

and give the text cursor something to do with:

PRINT "HELLO"

The greeting should appear two lines down the screen with the prompt > and the flashing text cursor on the next line.

Now since we've just changed mode and haven't used VDU 24 to mess about with the graphics window the graphics cursor will be lurking transparently at the bottom left corner of the display. Move it to the centre of the screen with:

MOVE 648,512

Now use:

VDU 5

to join the text and graphics cursor. What happens?

The answer is that the text cursor joins the graphics cursor in the middle of the screen. It also shares the graphics cursor's cloak of invisibility.

However the fact that the prompt is there at the middle of the screen gives the game away. A text character, in this case >, has been printed at the place we moved the graphics cursor to.

If you now add some more text such as:

PRINT "Hello"

you'll see this command appear next to the mid-screen prompt. However once you've pressed Return the HELLO appears on the next line, back at the left side of the screen as usual.

So after a VDU 5 you can MOVE the graphics cursor to anywhere on the screen and have text appear there.

However a PRINT command, with its in-built carriage

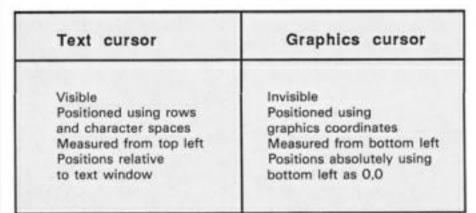


Table I: Text and graphics cursors - the differences

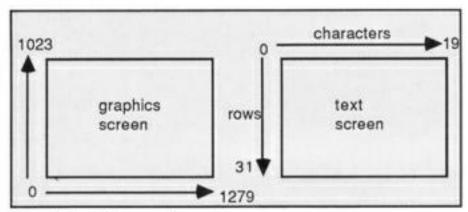


Figure I: Mode 5 text and graphics screen

Graphics



MOVE 788,788: PRINT "HELLO"

and you'll see the familiar message at the top right of the screen. The prompt faithfully appears one line below, to the left of the screen.

Have a go moving the graphics cursor around the screen and printing text there. Once you've got the hang of it you'll be glad to know that you can "switch off" VDU 5 with VDU 4 or a mode change.

But what, you might ask, is the use of VDU 5? The answer is that it's got lots of uses, as we'll see later in the series.

However for the moment consider Program I which continues the friendly mood by writing 10 HELLOs on the screen.

18 REM Program I 28 MODE 5 38 FOR loop=1 TO 18 48 PRINT TAB(loop) "HELL 0* 50 NEXT loop

There's nothing difficult about it, just a FOR...NEXT loop which produces one HELLO for each pass.

The only remotely interesting bit of the program is the way that the loop control variable, loop, is used in line

Because loop is inside the

brackets following the TAB each time round the loop the H of HELLO is printed in a different place.

The first time round the loop loop is 1, so the H appears two character cells in from the left. The next cycle loop is 2 and so the H appears in the third character cell along the line. This carries on throughout the loop.

The result is a set of 10 HELLOs, each indented by one space. And if you think I was one character space out on the above, then you've forgotten that TAB starts counting at 0.

Now suppose, for deep and meaningful aesthetic reasons of your own, you wanted to improve the layout of these 10 HELLOs.

To artistic temperaments, such as yours and mine, the sight of all those Hs, dutifully lined up under the E of the previous HELLO is an affront

Suppose we wanted to have each successive H cen-

tred under both the H and the E of the previous HELLO? Can we do it?

Try it and see. You'll find that if you try to get half-character spaces with TAB you won't get very far! No, what you have to do is resort to VDU 5 as Program II shows.

10 REM Program 11 20 MODE 5 30 VDU 5 40 FOR loop=32 TO 352 ST **EP 32** 50 MOVE loop, 1023-100p 68 PRINT "HELLO" 78 NEXT loop

Program II

The structure of the program is similar to Program I's, but now there's a VDU 5 to ensure that the graphics cursor can be used to position text. The figures after the FOR have changed but the loop still cycles 10 times printing HELLO. Only now the HELLOs are indented half a character space each time. How's this done?

The answer lies in the MOVE of line 50. This ensures that for each pass of the loop the graphics cursor is positioned correctly.

The first time round, loop is 32 so the MOVE takes the joint graphics and text cursor to 32,991. It's here - courtesy of VDU 5 - that the PRINT puts the message.

The next time round the loop, the MOVE sends the cursors to 64.959 and so on.

Each time round the H appears 32 graphics units to the left and 64 graphics units lower down the screen than the previous one. This just happens to be half a character space in, on the line below.

Suspicious readers may be wondering just where I got those figures from. The answer is that I used the information from Figure I.

In Mode 5 there are 20 character spaces across the screen. Now these occupy the same space as 1280 graphics coordinates, so it's a simple bit of maths (1280 divided by 20) to see that one character takes up 64 graphics units across.

So half a character is 32 graphic coordinates wide. And since Mode 5 has 32 lines down the screen, each character is 32 graphics units deep.

Figure II shows the dimensions of one character.

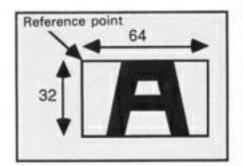


Figure II: Character cell measured in graphics unit

Once you've seen how Program II works can you modify it so the indentation is, say, a quarter or three-quarters of a character space?

 That should keep you busy until next time when we'll be taking a further look at VDU 5.

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Get your pulse rate racing

Program: US Drag Racing

Price: £6.95

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4TE. Tel: 091-414 4611

THE scene is the Clifton Center, Arizona. Your dragster is ready on the track and so is that of your opponent Pete Piston. Out comes the track marshall who waves you forward. Your support team of mechanics gives you the required push and Pete's crew does the same for him. Then comes the instruction to start engines. You build up the revs, slip her into gear and you're off, hurtling down the track in hot pursuit of Pete.

Your aim is to beat Pete to the winning post one quarter of a mile down the track. Success will up your rating from novice to rookie and you can then try your skill against Tex Turbo.

Beat him and you become a pro and face Clint Clutch, and then on to Sam Servo who is demonically fast. If you get past him, you're a faster driver than me.

Your accelerator pedal consists of the greater than and less than keys. These

must be hit alternately as fast as you can. The spacebar serves as the gear change and as far as I can discover you can only change up through the gears.

If you go into top gear too early, the car's lack of torque will mean a loss of acceleration and certain defeat. It all means that you need not only really nifty fingers, but also a good sense of timing.

As is so often the case in this type of game, both cars stay still and together in the centre of the screen while the background, in this case white lines, scrolls past.

The display gives no indication of who is winning, which means it is essential to read the distance indicators as well as your rev counter and speedometer. It's a game that will keep your eyes and fingers busy.

Sadly, winning a single race may not be enough. You take part in three races against each opponent and you only win if your fastest time is better than his. I developed a policy of really going for it in the first race and sauntering through the other two to give my fingers a rest.

The graphics are neat and tidy, as they should be with so little on-screen



movement. My favourite feature is the parachute that slows you down at the end of the race. The sound gives you a good idea of the speed you are travelling, but is rather unimaginative.

My main concern is that this type of game is bad for keyboards. My Plus 1 joystick interface didn't work with it, so it is almost impossible to avoid hammering the poor keys. If you are prepared to risk it, Drag Racing will get the adrenalin pumping as you desperately try to beat the opposition.

Rog Frost

Sound	
Graphics	
Playability	
Value for money	
Overall	

Compete at the Games

Program: Commonwealth Games
Price: £7.95 (cassette) £9.95 (disc)
Supplier: Tynesoft, Unit 3, Addison
Industrial Estate, Blaydon, Tyne & Wear
NE21 4TE, Tel: 091 414 4611

AS so many athletes boycotted this year's Commonwealth Games in Edinburgh you have been given the opportunity to enter eight of the events. Have you got what it takes to compete with the world's greatest athletes?

The events are stored on one side of a cassette and must be loaded in strict sequence – there is no menu allowing you to load individual events. You compete in hammer throwing, swimming, cycling, 400 metres, long jump, steeplechase, rowing and weight lifting. Pressing the Z and X keys alternately determine power or speed, while the spacebar initiates a throw.

The graphics are drawn on a grand scale - none of these weedy little stick

men running around. In the hammer throwing you only see the top half of the athlete as he turns in the circle. After his third turn a meter displaying an angle bursts into life. Hit the spacebar when it reaches the angle you desire and away soars the hammer to an incredible distance – about five metres in my case.

The cycling is another graphically pleasing and original event. The action takes place in three separate screen windows, the top displaying a plan of the circuit and indicating your position. The next one provides a sideways view of you on the bike, and the third a head-on view.

Great care must be taken not to enter the bends too quickly or you will find yourself rolling down the track ahead of the bike.

In the events which are completed quickly, such as the hammer, the ability to re-run would have been helpful. Likewise with the long boring events such as the 400 metres.

It would also have been nice to have



had an abort key which allowed you to skip one or two of the heats if you so wished.

Commonwealth Games is a fine example of an athletics program, but could have been even better with a little more forethought.

Steve Brook

Sound	4
Graphics	
Playability	
Value for money	
Overall	8

Hassle in the classroom

Program: Mikie Price: £9.95

Supplier: Imagine, 6 Central Street, Manchester M2 5NS. Tel: 061-835

THIS game, set in an American high school, stars an all-American schoolboy Mikie who is trying desperately to get a message to his sweetheart. You have just volunteered to help him.

The first screen provides an aerial view of a classroom. There are nine desks with pupils sat at each one, and beneath five of their stools are little red hearts. As you collect each one they change into letters to form a message to his girlfriend.

When you collect the fifth heart the classroom door opens allowing you on to the next level.

Collecting the hearts isn't quite as easy as it could be as your fellow pupils won't stand up to let you at them so you have to bump them off their seats using your hip-zap technique.

On top of this you receive a great deal of hassle from the teacher who doesn't like you disturbing the class. If things begin to get too hairy you can always find yourself a vacant stool and sit down for a while – but not for too long, otherwise the teacher's false teeth will fly towards you.

Having escaped the classroom you must negotiate the hallway to reach the next room. The hall is patrolled by a teacher and a mad janitor, so nimble footwork is required.

Screen two is set in the locker room with several lockers containing three hearts. You stand in front of the locker and press the "shout" key three times to release the hearts. This time you are being chased by the teacher, janitor and chef.

The same sort of thing is repeated in the canteen, gymnasium and schoolyard.

I found survival has a high random factor. Sometimes the teacher will plod around in a corner and you sail through



the screen. On other occasions he will be hot on your heels and you will lose all three lives on the first screen.

The graphics are crude and the animation not much better. Mikie was never destined to be a blockbuster, but a little more care on the graphics side would have been greatly appreciated.

Jon Revis

Sound	5
Graphics	
Playability	
Value for money	7
Overall	

A classic from Robico

Program: Myorem (Rick Hanson 3)

Price: £9.95

Supplier: Robico, 3 Fairland Close, Llanstrisant, Mid Glamorgan CF7 8QH.

Tel: 0443 227354

DURING the past 15 months Wheel of Fortune, Woodbury End and Rick Hanson have been battling it out for the honour of being the number one adventure program available for the Electron. Now there is a new pretender to that crown.

You begin the adventure in the now familiar role of super spy Rick Hanson and in a strange predicament: "Gazing around, you see that you are in the south-east corner of a large dusty arena, bound to a sturdy post by thick ropes. "Smooth stone walls, ancient and yellowing, surround you, reflecting the sunlight into your eyes. You are choked by the gag pushed into your mouth minutes before. You can say nothing. You can do nothing. You only have your thoughts".

You can't move, shout, twitch or even smoke a last cigarette – all you can do is think. That is the crux of your success or failure. "You close your eyes and the memories come streaming back to you ... your mission to lead a coup against a South American junta ..., that abhorrent prison ... your evasion of the soldiers and eventually your leap for cover into the gaping blackness of the ditch."

The atmosphere created by these memories is such that it will transport you into Rick's psyche. I won't give away any more of the plot as Robico is offering a £100 cash prize to the first person to complete this adventure. So if you want that prize you will have to earn it.

The program accepts multiple statements such as: "Get all the pens except the red one and write with the black one." This is a welcome relief from the all too common "Get pen" maximum allowed by most adventures.

As with all Robico adventures, Myorem is packaged in a professional manner with full game details, an Adventurer's Notebook, and an envelope for obtaining limited hints from Robico for the less intrepid adventurer.

Myorem is definitely the best text adventure I have yet seen for the Electron. Its evocative descriptions and



superb plot must make it a classic addition to any discerning collection — and you don't need to have played its predecessors to enjoy its richness.

Buy it - you won't find better.

Pendragon

Presentation	10
Atmosphere	10
Frustration Factor	. 9
Value for money	
Overall	10

Not currying favour

Program: Vindaloo Price: £7.95

Supplier: Tynesoft, Addison Industrial Estate, Blaydon, Tyne and Wear NE21 4TE. Tel: 091-414 4611

HOW on earth can you make a game out of a curry? The clue lies in the last three letters of the title, and your aim is to become "flushed" with success.

The storyline concerns Raj, who runs an Indian take-away, but has eaten one curry too many and is now in urgent need of relief. The vital facility he requires is deep in the cellar under the shop and your job is to guide him to it.

Finding the route is not too difficult. You start at the top of each screen and work your way to the bottom. Your controls are just left and right – you fall from one floor to the next.

To make the journey you have to cross bridges which vanish quickly and, in some cases, unpredictably. You also have to cope with lifts. You can fall on to them while they are moving downwards, but you will lose a life if you fall on to a lift which is rising to meet you.

Apart from having to judge the moving platforms, you have to steer Raj through collections of animals that bounce up and down on elastic threads. Fortunately they move in a well-ordered manner and you soon learn how to avoid them.

If you load the game but don't start playing it straight away you'll get a display of each of the 20 rooms in turn. It is well worth the time looking through all of the screens so that you can learn the hazards before you are plunged into them.

You will also be able to enjoy the good quality scenery, the pleasing plinky-plonk sounds and the humour in the room names.

Vindaloo is a nice idea and most of the programming is good, but playing it proved something of a disappointment.

It could be that Raj, who looks like an



Egyptian mummy with a rucksack, flickers horribly, or it could be that the dissolving pathways just have me beat. Or perhaps it is that the whole game is too slow – Raj moves at the right speed, but you have to spend too long waiting for the bridges, lifts or elasticated animals to be in the correct places. Whatever it is, Tynesoft's Vindaloo is not for me.

Rog Frost

Sound		7
	y	
	money	

Why talk when you can fire?

Program: Psycastria

Price: £7.95

Supplier: Audiogenic, 12 Chiltern Enterprise Centre, Station Road, Theale, Berks RG7 4AA. Tel: 0734 303663

YES folks it's time once again for some good old zap and blast. Why communicate with alien life forms when you can incinerate them? The alien command bases are located on land, at sea, on the moon and in space. Your task is to decimate all four.

Play is limited to a narrow window in

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the middle of the screen, best described as Zaxxon viewed from directly above the ship. This provides you with a bird's eye view of the buildings and weapons which constitute the enemy base.

Your ship, always positioned midscreen, is allowed to move from side to side in order to avoid buildings. The screen scrolls continuously from right to left or vice versa, depending on which way you are facing. Scenery and enemy forces are drawn using good detail and are animated faultlessly.

You begin your attack from the left of the command base, flying at ground level dodging to each side, shooting tanks and ammo dumps.

If you haven't destroyed everything by the time you reach the right of the base your ship flips over automatically and you return to destroy the remaining defences.

The enemy is present in the form of numerous fast moving UFOs which come screaming in trying to ram or shoot you down. Owing to their high speed you cannot wait to see the whites of their eyes before firing. Adopt the age old technique of continual rapid firing whether the enemy are on the screen or not.

While on the subject of the enemy



craft, do watch out for the tail gunner. On several occasions I nipped into an alien's slipstream only to receive a laser salvo from its rear end.

An annoying feature is that when your ship is destroyed you are returned to the start and all the enemy tanks and ammo dumps are replaced.

This means that the only way you are going to reach screen two is to wipe out the enemy using a single ship. There is no way you are going to achieve this in your first few minutes: The aliens come thick and fast, and their aim is deadly.

Psycastria is a very good arcade game let down by rather difficult play.

James Riddell

Sound	6
Graphics	9
Playability	_
Value for money	
Overall	-

A matter of appearance

AS they've pounded away at their Electron's keyboard, keen and eager readers may have noticed the difference between:

PRINT "a"

and:

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

PRINT 1

(besides the fact that one is used to display a string while the other is a number). It's all to do with the screen's appearance. While letters and messages are printed at the left edge of the screen, numbers are treated differently they're shown inset from the left. The rule is that the rightmost figure of the number, the units column if you like, is 10 character spaces in from the left. This means that:

> PRINT 123 PRINT 12 PRINT 1

will have the 3, 2 and 1 all lined up under each other, ten spaces in from the left of the screen as like this:

> 123 12

When you switch on, your 40 column display is divided into four fields, each of 10 characters. Strings are printed aligned to the left of the display field, numbers to the right. This will be made clearer if you enter:

> PRINT 1,2,3,4 PRINT "one", "two", "three", "four"

From these lines you'll see that PRINT can have one or more items after it, separated by commas. These lists of things after the PRINT are known, logically, as the print list. And you don't have to have commas, there can be spaces, semi-colons or even apostrophes. And each acts differently. See if you can figure out the rules from the results of:

> PRINT 1,2,3 PRINT 1;2;3 PRINT 1:2:3; PRINT 1 2 3 PRINT 1'2'3 PRINT :1 PRINT PRINT "a" "b" "c" PRINT "a"; "b"; "C" PRINT "a" "b" "c" PRINT "a""b""c"

To summarise, a comma separates the print list into the screen fields, a semicolon "glues" them together, while an apostrophe starts on a new line for each item.

Don't worry too much about the different fields at the moment, as you need them they'll make more sense.

TREVOR ROBERTS does some more down-to-earth talking

0

Let your micro show you

A good question is what if an item in a print list exceeds 10 characters in length? Try it and see with:

PRINT *abcdefghijkl* PRINT "abcdefghijkl", "abcdef", 3

We've seen that PRINT can be used in two ways, to display messages and do sums. Can we have it working in both ways at once? Again the micro is willing to answer your question in response to:

PRINT 1+2, "a sua" PRINT "a string" number

As a basic Basic rule, if you want to know "what happens if . . ." try it out on your micro. You won't learn Basic just by reading about it, you'll have to try it for

You'll find that your micro makes a first class "teacher", immediately reacting to any nonsense you've sent it Mind you, it's lacking a little in tact. Notice that in the first case:

PRINT 1+2, "is a sum"

had the 3 next to the i of is. In this case it's obvious and

PRINT 1+2," is a sua"

but it can lead to problems when using print lists such as:

PRINT 2+4, "111"

where the two pieces of output join together on screen. By now you should be able to distinguish between:

PRINT "3+4"

and:

0

0

0

•

PRINT 344

and be able to get the micro to tell lies with lines like: PRINT "1+1=";3

No such variable

You know that entering:

PRINT "a"

and pressing the Return key produces an a on the screen while:

PRINT 3

will produce the number 3. Also, PRINT can be used for displaying strings and doing sums with numbers (in the case of PRINT 3 there were no other numbers so 3 was the result). Now try:

PRINT a

and see what you get. You get an error message - in this case:

No such variable

This is as it should be, as a is neither a number nor a string (which has to be enclosed in quotes). But why that particular message? What's a variable?

Let such variables be

To show what a variable is we have to learn another Basic keyword, LET. Try entering:

LET a=5

and see what happens. From the looks of things nothing, but don't let appearances fool you (no pun intended). Below the surface of the micro, the operating system is beavering away all the time and when it comes across the command LET it leaps into action. Just what it does is shown by getting the micro to:

PRINT &

when, magically, 5 appears. The LET statement has arranged things so that the letter a now stands for 5. That's why there's no nasty:

No such variable

message when you:

0

0

0

PRINT &

this time. It's because the LET has created a variable named a. When the Electron comes across the a, it knows that it's not a string (no quotes), it's certainly not a number, so it must be a variable. It then looks up an internal list of all the variables, if any, that have been created by LETs to see what value a should have. If it can't find one it tells you, quite rightly, that it's never heard of it.



Various variable uses

0

0

0

0

0

Once you've created a variable with a LET you can use it just as though it was a number. After making sure that you've created the variable with:

LET a=5

(technically known as an assignment statement) you can use it in sums as the lines:

> PRINT a+3 PRINT 2+a

PRINT a+a

show. And you're not just stuck with one variable. Set up another with:

LET b=12

and see it in action with:

PRINT b+b

PRINT atb

PRINT a+b

Try making up your own variables, LETting them have the values of your choice. And if the screen gets untidy wipe it clean with a quick CLS. Notice, however, that CLS only clears the screen, it doesn't do anything else to the micro. The variable a is still there as a quick:

PRINT a

will show.

That's all for this month. Next time we'll find out how usefully variables can vary.

SITUATION VACANT

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The BBC Master Compact, on the other hand, will be valued for more practical reasons. No doubt your child is already familiar with BBC micros from the classroom.

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Like a Teddy Bear, it can be justified as an essential purchase.

AND RELEASED FROM SELECTED BRANCHES OF CURRES DRONG JOHN LEWIS LIGHTS, WHI SWITH AND HOLD RECORDER LEWIS AND JOHN LOWER LIGHTS, WHI SWITH AND HOLD RECORDER AND COMPANY OF THE WASTER COMPANY OF THE AND JOHN LOSS INTO RECORDER AND A FUTURE STATE AND JOHN LOSS INTO RECORDER AND A FUTURE STATE AND A FUTURE STATE AND A FUTURE COLORS WONDOW OWNER DESK TOP EXTERN AN ADVANCED DESCRIPTION OF A PROGRAMMEN FOR A MOVED LEVEL AND A FUTURE STATE AND A FUTURE COLORS WONDOW OF A MOVED LEVEL AND A FUTURE STATE AND A FUTURE COLORS WONDOW OF A MOVED LEVEL AND A COMPANY OF A MOVED LEVEL AND A MOVED LEVEL AND A COMPANY OF A MOVED LEVEL AND A MOVED LEVEL



Two things your fi



The BBC Master Compact.

ve year old will still value at twenty-one.



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NUMBER SIGNS

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BALANCE

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HANGMAN

Improve your child's spelling with this fun version of the popular game



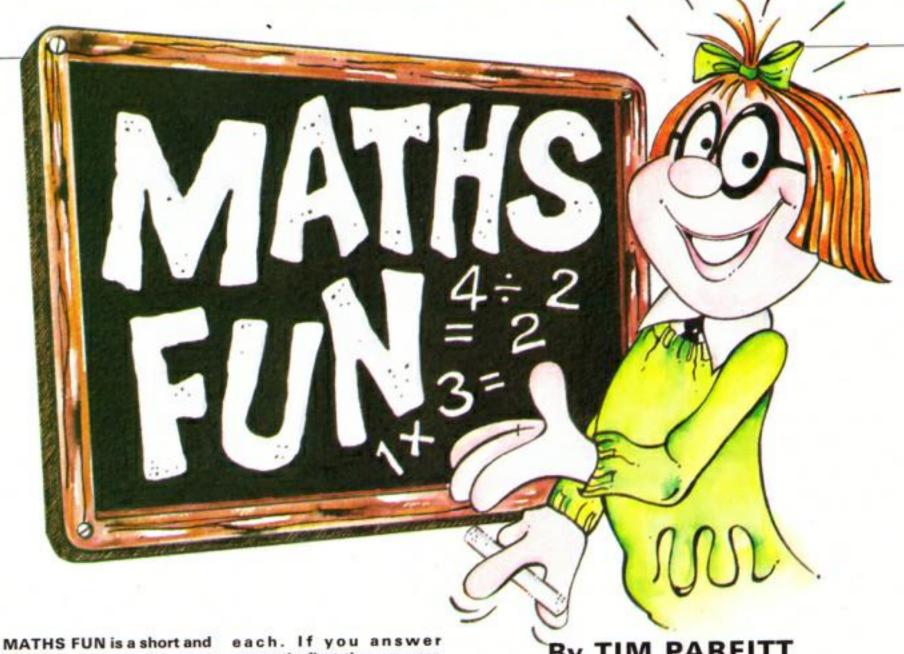
ODD MAN OUT

Find the word that does not fit before your time runs out

Ages 8-12

Anagram
Codebreaker
Dog Duck Corn
Guessing
Hangman
Maths Hike
Nim
Odd Man Out
Pelmanism
Towers of Hanoi

TO ORDER TURN TO THE FORM ON PAGE 53



simple program to test youngsters' mental arithmetic.

There is a choice of four types of question, addition, subtraction, multiplication and division.

There are also four levels of difficulty ranging from very easy to quite hard, so you should be able to find a level to suit most children.

There are 10 questions to answer and you are allowed three attempts at correctly first time you are awarded 10 points.

Six points are awarded for a correct answer on the second attempt and two for the third.

If you don't know the answer you'll be told after three attempts.

After answering all 10 questions you'll be informed of your percentage score for the test.

You can abandon a test at any time and return to

By TIM PARFITT

the main menu by pressing Escape. You can then select a different class of question.

Full listing starts on Page 22

VARIABLES

Multiplication, addition, subtraction or divistype\$

Skill level - 1 to 4.

level

Loop counter for 10 questions. Points awarded for each answer. question

points

Total score so far.

score question\$

The question.

num1

First number of question. Second number of question.

num2

Correct answer.

ans Inputted answer. answer\$

LEVEL 2, Multiplication:

Total score = 40

9 × 2 = 18

CORRECT , you score : 10

Press Space to continue..

PROCEDURES

error

levels questions

numbers

instr Prints instructions. double (word\$,x,y) Prints word\$ in double height at x,y. Waits for spacebar to be pressed. Reruns game if Escape has been pressed, or prints error message. Gets level and type of question. Prints questions and checks answers, prints current score.

Sets numbers for questions.

From Page 21

10 REM Maths Fun 28 REM By Tim Parfitt 30 REM (c) Electron User

40 ON ERROR MODE6: PROCer

ror: END

50 *FX16

68 MODE 1: PROCinstr

78 REPEAT

88 PROClevels

98 PROCquestions

100 UNTIL FALSE

110 END

120 :

130 DEF PROCINSTR

140 CLS

150 VDU 23,1,0;0;0;0;23,2 26,0,8,0,127,0,8,0,0,23,227

,0,34,20,8,20,34,0,0 160 PROCtitle

170 VDU19,3,4;8;:COLOUR 3

180 PRINT " This is a ma ths game designed for diff-"'erent ages. There are fo ur skill levels"'"with lev el one being the easiest an

d "'"level four the hardes t. In each level*

198 PRINT' you can choose between aultiplication,"" "division, addition and sub traction."'" When answerin q the questions you will"" "be given three tries. If y

200 PRINT' correctly the first time you will be" "a warded ten points. If you a nswer"'"correctly the seco nd time you will be"' awar

ded six points."

ou answer"

210 PROCspace (6, 30, 1): CLS 220 PROCtitle : COLOUR 3

230 PRINT" "If you answer correctly the third time"' "you will be awarded two p oints. If you"" do not get the right answer the corre

ct"'"result will be displa

yed. You will be"

240PRINT "asked ten quest ions and your score out" " of one hundred will be disp layed at the" "end."

25@PRINT " To re-run thi s game just press Escape." 260COLOUR 1:PRINT''' Pr ess S for sound or Q for qu iet"::REPEAT KX=GET AND &DF :UNTIL KX=83 OR KX=81:IF KX =81 THEN OSCLI"FX218,1" ELS E OSCLI"FX210,0"

270ENDPROC

280 DEF PROCdouble(word\$,

x,y)

290 AX=10 : XX=&70 : YX=0 300 FOR IX=1 TO LEN word\$

310 SOUND 1,-15, ASC (MID\$ (

word\$, [7,1))-20,2

320 ?&70=ASC (MID\$ (word\$, I

7,11)

338 CALL&FFF1

340 VDU23,224,?&71,?&71,? \$72, ?\$72, ?\$73, ?\$73, ?\$74, ?\$7 4,23,225,7475,7475,7476,747 6, ?477, ?477, ?478, ?478

350 PRINTTAB(x+IX,y); CHR\$ 224; TAB (x+IX, y+1); CHR\$225

360 NEXT: ENDPROC

370 DEF PROCspace(x,y,col

) :*FX21

380 COLOUR col : PRINTTAB(x,v)*Press Space to continu e..." : REPEAT UNTIL GET=32 :SOUND 1,-15,58,2 :ENDPROC

390 DEF PROCtitle

400 COLOUR 2:PROCdouble(*

-+"+CHR\$226+CHR\$227+" MATHS FUN "+CHR\$227+CHR\$226+"+-" ,9,1)

410 COLOUR1: PRINT TAB(12,

3! "By Tim Parfitt" 420 ENDPROC

430 DEF PROCerror

440 IF ERR=17 THEN RUN EL SE PRINT ": REPORT: PRINT "

at line "; ERL

450 ENDPROC

460 DEFPROClevels

478 type=8 :type\$="" :lev el=8 :level\$=""

480 VDU26 :CLS:PROCtitle

490 COLOUR 3: PRINTTAB(2,6) "Which type ?"

500 COLDUR 1: PRINT' SPC (6)"1.....multiplication ":PR INT SPC(6) "2....division " :PRINT'SPC(6) "3....additio n *: PRINT'SPC(6) *4....subt raction."

510 REPEAT : type\$=SET\$:UN TIL INSTR("1234", type\$) 520 SOUND 1,-15,100,2

538 IF type\$="1" THEN typ

e\$="Multiplication" :type=1 540 IF type\$="2" THEN typ es="Division" :type=2

550 IF type\$="3" THEN typ es="Addition" :type=3

560 IF type\$="4" THEN typ e\$="Subtraction" :type=4

570 COLOUR 3:PRINTTAB(2,1 8) "Enter level (1 - 4).."

580 REPEAT :level \$=GET\$:U NTIL INSTR("1234",level\$) : level=EVAL(level\$)

590 SOUND 1,-15,100,2

600 COLOUR 2: PRINT TAB(2, 21) "LEVEL "; level\$; TAB(2,23

);type\$

610 COLOUR 1:PRINTTAB(3.2 6) "Is this correct (Y/N)

628 IF GET\$="Y" THEN SOUN D 1,-15,75,2 :ENDPROC ELSE GOTO 480

630 DEF PROCquestions

640 score=0

658 CLS: COLOUR 3: PROCdoub le("LEVEL "+level\$+", "+typ e\$+" :",4,1)

668 VDU 28.0.30.39.6

670 FOR question=1 TO 10 688 COLOUR 1 : PROCdouble("Total score = "+STR\$(score

1.1.0) 698 PROChumbers

700 COLOUR 1 : PROCdouble(STR\$(question)+".",1,6)

718 COLOUR 2 : PROCdouble(question\$,6,6)

720 points=10

730 PRINTTAB(LEN(question \$)+8,6);SPC(3);CHR\$(10);STR ING\$ (3, CHR\$8); SPC (3)

740 COLOUR 3 :answer\$="" :REPEAT :6\$=6ET\$:answer\$=a nswer\$+6\$

750 PROCdouble(6\$, LEN(que stion\$)+6+LEN(answer\$),6)

760 UNTIL LEN(answer\$)=LE N(STR\$(ans))

778 SOUND 1,-15,75,2

780 IF answer\$=STR\$(ans) THEN COLOUR 2 : SOUND 1,-15, 150,5:PRINT''"CORRECT , you score : ";points :score =score+points :60T0820

798 IF answer\$()STR\$(ans) THEN COLOUR 3 : SOUND 1,-15 ,20,5 :PRINT "" "WRON6 " : points=points-4

800 IF points =2 OR point s=6 GOTO 738

818 COLOUR 2 :PRINT "Th

e correct answer is ";ans 828 PROCspace(6,28,2) :CL S : NEXT

830 CLS : COLOUR 2 : PROCd ouble("You scored "+ STR\$(s core)+" out of 100 .",1,2)

848 COLOUR 1 : PRINT TAB(6 ,20) "Press Space to play ag ain.."

850 REPEAT UNTIL GET=32

868 SOUND 1,-15,100,2

878 ENDPROC

888 DEF PROCnumbers

890 question\$=""

900 ON type 60TO 920,960, 1000,1048

910 REM multiplication

928 nue1=RND((5)*level):n um2=RND((5)+level) :ans=num 1+num2

938 question\$=STR\$(num1)+ " "+CHR\$227+" "+STR\$(num2)+

948 ENDPROC

950 REM division

968 num2=RND((5)*level):n um1=num2+(RND(5)+level) :an s=nue1/nue2

978 question\$=STR\$(num1)+ " "+CHR\$226+" "+STR\$(num2)+

988 ENDPROC

990 REM addition

1888 IF type=3 THEN num1=(level #4-2) #5: num1=num1-RND(numi) :num2=(level*4-2)*5:n um2=num2-RND(num2) :ans=num 1+num2

1818 question\$=STR\$(num1)+ " + "+STR\$(num2)+" ="

1828 ENDPROC

1030 REM subtraction

1848 IF type=4 THEN num1=(level+3-2)+10 :num1=num1-RM D(num1) :num2=num1-RND(num1) :ans=num1-num2

1850 question\$=STR\$(num1)+ " - "+STR\$(num2)+" =" 1868 ENDPROC

This listing is included in this month's cassette tape offer. See order form on Page 50.

I'VE already had some very nice letters from people who have benefited from the debugging tips we've looked at so far.

One delighted young man said that he'd given up the ghost on eight of his listings but has since managed to resurrect every single one, all thanks to my simple hints.

I was quite chuffed and it encouraged me to look for additional ways to help you with any listing problems you may still have.

In the August issue of Electron User we looked at methods of moving progressively through your program using the STOP command to narrow down the location of a typing error.

There are a couple more similar ideas that you could use in circumstances where you don't want the "STOP at line" message printed on the screen.

The command END inserted in the same way as STOP will result in only the > prompt appearing to the screen.

If you want to avoid any message at all the method to use is to insert a dummy line in the form:

28 BOTO 28

This literally suspends the program at line 20 until you

REMs can help pin down some listing puzzles

ALAN McLACHLAN shows how to find the typing mistakes that produce those dreaded error messages

press Escape, assuming the Escape key has not been disabled with a *FX229 or *FX200 or used in an ON ERROR trap. Check the listing carefully if the Escape key has no effect.

I used this hint recently to find a well hidden mistake in a simple maze game my young son had been trying to write.

If I take you briefly through the procedure it may help if you encounter similar problems.

Once the screen had initialised, but before the actual game got under way,

the maze scrolled up one character, and the resulting screen display was just about recognisable, but rubbish.

From a quick read through his listing the appropriate procedure appeared to be typed in correctly - I mentioned last month the advantage of being able to read through any part of a listing and know what was going on.

Here I didn't have to read through the whole program because I was able to find the procedure that he used to initialise the screen. It was in the listing between lines 900 and 980.

I first tried the STOP idea that I showed you. This, of course, printed the "STOP at line . . ." message and scrolled the screen anyway, so it didn't help in this case.

The way I found the bug was to type in the dummy line:

985 BOTO 985

and check to see if the offending scroll had occurred. It hadn't, so I deleted line 905 and replaced it with:

915 80TO 915

and so on until I had just used:

945 BOTO 945

and knew that this was just

after the instant that the screen scrolled.

I re-checked by putting in the dummy line again just before – in line 935 – to make sure.

To cut a long story short I then listed what appeared to be the offending line and found in fact two lines, 930 and 940, joined together as one.

How could this happen? Very easily when you are using the Copy key for editing. I'm sure you know what I mean, but I'll show you an example. If:

LIST 20

results in the following being displayed:

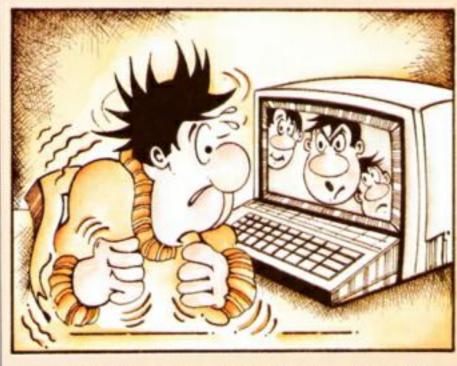
20 MODE 1: PROCinstr: PROCinit: PROCvar 30 PRINT "Al's Game"

line 30 must have been copied on to the end of line 20, otherwise it could not be seen on screen with the command LIST 20.

This won't happen often, but it's happened to me more than once and, in the way of things I've no doubt it will turn up again. It's certainly worth bearing in mind.

Another useful hint for finding an error without destroying any part of your program is to REM the particular line that you think is causing the trouble.

As you should know by now, anything following a REM statement (short for REMark, or REMinder if you like) is ignored by the program. (Sometimes when I'm talking



"... the maze scrolled up one character, and the resulting screen display was just about recognisable, but rubbish".

From Page 23

to the kids I get the feeling that everything I say begins with a REM.)

So inserting a REM at the start of a line results in all the commands in that line being ignored.

You could achieve the same effect by deleting the line completely, but by using REM you still have the line intact on-screen.

Returning things to the original state is simply a matter of deleting the REM rather than typing in the line again.

You can insert the REM in any part of the line after a colon. You can even bypass a whole procedure by REMing the line which contains the PROC. This is a useful way of avoiding screens of instructions at the start of a game.

But be careful that no variables are set up in the routine, or you'll get some annoying results.

You can, of course, use a REM to negate the effects of disabling the Escape key, as mentioned earlier.

Sometimes you get strange results on the screen, but because things happen so fast it's often difficult to establish exactly where in the program a certain action is taking place.

For example, in another of my young son's programs I recently looked at there were all sorts of weird shapes dotted about the screen. None resembled the shapes that should have been there.

In order to solve this apparent disaster it was



"Sometimes when I'm talking to the kids I get the feeling that everything I say begins with a REM".

necessary to pinpoint when these "thingies" were being put on screen.

Finding this exact moment can be a bit hit and miss, even using the STOP hint we've discussed.

The following routine should narrow down the areas of trouble by putting control of the whole screen display literally under your finger tips, a frame at a time.

It's very important that you follow these steps exactly or else you're going to have even weirder results than the ones you had in the first place.

Make sure that the Escape key gets you out of the program and that your listing is numbered in 10s, even if you have to renumber it yourself.

You achieve this by typing in the command RENUM. Now type in the following in direct mode, in other words

without a line number:

*KEY1AA=BET!M

This line sets up function key 1 with the command AA=GET, which is used to make the program wait for any key to be pressed before it continues.

Next type in:

AUTO 5

and when the line number 5 is displayed keep your finger on f0. You will see the AA=GET line being automatically entered in every alternate line of the program, those ending in the number 5.

Continue until you reach a line number higher than the final one of your original program. At this point in the proceedings if you list the program you will see every alternate line containing the new instruction.

Now run the program, and providing you have done everything right, you should be able to single step through the program at your own speed and watch for something on the screen that you want to trap.

As soon as you see it pressing Escape will jump out of the program at a line number very close to your mistake. It can't be the exact line number of course because you will always stop at a line ending in a 5.

While this routine may not pinpoint the error exactly, at least it will stop you in the procedure that is causing the problem.

When you've finished, removing the odd line numbers is a simple matter. Just type:

AUTO 5

and keep your finger on the Return key until you have entered blank lines in all those odd number lines ending in a 5.

Well I think you've had enough practical tips to be going on with but I'll end with a word of warning.

Armed with your newfound knowledge, there may be a great temptation to burn the midnight oil hammering away trying to find that "one last bug".

This is great if things work out well, but not so great if you're having a rough time. The programmer's bible states: "In every program there is always one more bug".

You want to hear our editor after a late night de-bugging session: "Got that darn program working at last lads. Took me till 3 this morning, but I finally cracked it", he mumbles, propping eyelids open with two matchsticks.

"Super", thinks I, "but we know we're going to pay for it later in the day when he's shattered".

Don't do it unless you are really under pressure. Give yourself a break. Make a cuppa, throw stones at next door's dog or get another program out and tinker with that for a bit.

But don't be too insistent on finishing it all in one session.

Programming is fun and the results can be very rewarding.

Let's try and keep it that way. See you soon.



"Armed with your new found knowledge, there may be a great temptation to burn the midnight oil".



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DO your fingers often ache from too much use of the cursors and Copy key? Do your programs seem to run amok after editing?

Well, your problems are solved because you can now be the BOS with this compact on-screen editor for the Basic programs.

If you have ever been in the middle of editing a line with the Copy key and the line you were on has just scrolled off the screen, or if you have ever wanted to be able to list backwards through a program, then BOS (Basic On Screen editor) is your answer.

BOS is a full on-screen editor, allowing you to scroll backwards and forwards through a program looking for the line you want to edit.

When you reach it you can move the cursor, inserting and deleting at will, while the rest of the line shunts backwards and forwards, automatically keeping step with you.

If BOS is present in your Electron – it will co-exist with most lengths of Basic programs – typing *LINE followed by a line number enters the editor with the specified line displayed on screen ready for editing.

If you just type *LINE with no following number BOS will default to the first line of your

program.

If you supply a non-existent line number as the parameter BOS searches for the next smallest number or defaults to the first line of the program — for example, if the first line number is 100 and you type *LINE 2, BOS will place you at line 100.

How is it done? Well the program has to co-exist with a Basic program without interfering with it in any way. To achieve this on Electrons with the Plus 1 or Plus 3 fitted I have used locations & 900-& CFF.

The only side effects of this are the loss of function keys and user-defined characters.

On tape-based machines I have used the first four pages of the Basic program area &E00-&1200, as pages &900 and &A00 are used as the cassette input/output buffers.

BOS uses several Basic rom routines shown in Table I where possible to save space.

The only notable exception to this is scanning backwards

Put the BOS in charge of your programs

CHRIS NIXON takes some of the toil out of tidying up your listings by providing you with a versatile Basic on screen editor

through a Basic program when the up arrow is pressed, looking for the preceding line.

This is more difficult than it first seems because, contrary to my first assumption, you can't simply go backwards and stop at the first carriage return character (&OD) you come to, assuming it marks the start of the preceding line, because both the high and low bytes of the line number and the line length byte can be &OD.

To overcome this problem I first used the Basic rom routine for finding a line by setting up a non-existent ever-decrementing line number, and testing it with this routine until an existing one was stumbled across.

Needless to say the further away from PAGE the current line happened to be at the time the more sluggish this method became.

So I eventually decided to write my own routine, which searches from PAGE forwards until it finds the line directly before the current line. This brought me precariously close to the end of my available memory.

Another meaty problem was discovered when I first attempted to copy a line from a Basic program into a buffer for editing.

I soon found that there is no rom routine for de-tokenising a line. The only similar routine is one that prints A as a character or token, but only on the screen.

I managed to use this routine by revectoring OSWRCH to point to my editing buffer instead of the screen, and then replace the old vector afterwards.

Although long-winded it is the only solution I have to date. Improvements will be gratefully accepted.

The third main problem was memory space. There are only four mostly unused pages available to disc-based Electrons, &900-&CFF, and none in tape-based machines.

By deciding that tape users would have to set PAGE to & 1200 for editing with BOS and therefore lose 1k, and by drastically cutting down onscreen messages, the program was shortened to 990 bytes.

The program also had to be flexible enough to permit users to access the Electron's own editing facilities as well, so I implemented *LINE line number to enter BOS at the desired line, and Escape to

re-enter Basic.

The program assembles the code from &900 to &D00 – &E00 to &1200 on tape based machines – and saves the object code as BOS.

To load the editor at any time type *RUN BOS and you are ready to load in and edit your Basic programs.

Unfortunately BOS cannot reside in the same area on tape-based Electron's as this is the cassette input/output buffer, and would result in BOS being corrupted upon the next load or save.

Therefore the first thing that the program does is to prompt you with the question "Disc or cassette?".

If the answer to this is C for cassette it assembles the code from &E00 to &1200, the program having already relocated itself to &1200 to allow for this.

It then saves the code to tape as BOS, with a load address of &EOO and an end address of &11FF. This means that you must have PAGE set to &1200 or higher if you are using tapes while editing your Basic programs with BOS.

Operation is the same for both disc and tape versions. Once BOS has been *RUN, the screen changes to Mode 6 and the message OK appears at the top of the screen. BOS is now ready to use.

To edit a Basic line type *LINE. BOS will then clear the screen and print the requested line in the centre of the screen between two horizontal borders, with the line number separate and above the first border. Table II contains a

getina	Get tokenised line number at PTRA.	&97DF
ptoken	Print A as character or token.	& B50E
plnum0	Print line number in INTA (no spaces).	&991F
plnum5	Print line number in A (field width 5).	89923
cston	Convert string to a number.	&AC34
schlin	Search for a Basic line.	89970
inslin	Insert tokenised line in Basic program.	& BC80
tline0	Tokenise line (all line numbers).	&8951

Table I: Basic rom routines and entry points used by BOS

complete list of the control keys for editing.

The only drawbacks with BOS are that only one Basic line is visible on-screen at a time and new lines cannot be created from within BOS.

For these reasons it is best to use BOS mainly as a debugging tool. So when you are presented with an error just jump into BOS at the line in question. Then you can quickly correct, enter it and exit back to Basic to carry on.

Finally remember to save the program before running it for the usual reasons corrupted programs, bruised knuckles and smashed keyboards.

I hope you enjoy this new addition to your repertoire of Electron User utilities.

Left arrow:

Delete:

Moves the cursor one character to the left through the line.

Right arrow:

Moves the cursor one character to the right through the line.

Up arrow:

Moves one line backwards through the Basic Moves one line forwards through the Basic

Down arrow: program.

Deletes the character at cursor position and

shunts all following text one character to the

Return: Re-enters current line into the Basic program. Any other key: Inserts character at cursor position and shunts all following text one character the right.

Table II: Control keys

	THAT PROJECT AND ADDRESS OF THE PARTY OF THE	Control of the Control of the Control	
10 REM BOS Editor	438 STA &288	898 .mainloop	1380 JSR &FFE0
28 REM By Chris Nixon	448 LDA #BOS DIV 256	900 JSR edit	1390 BCC notescape
30 REM (c) Electron User	450 STA &201	918 JMP mainloop	1400 .escape 1410 LDA #126:JSR &FFF4
48 IF PAGE>&11FF GOTO88	460 LDA *mess3 MOD 256	928 .screen	
50 *KEYO FORXX=TOP TO PA	478 STA &58	938 LDA #mess1 MOD 256	1428 LDA#4:LDX#8:JSR&FFF4
E STEP-1: ?(&1208+XX-PAGE) =	488 LDA tmess3 DIV 256	948 STA &58	1438 BRK
XX: NEXT: PA. =&1200: MOLD: MRU	498 STA &51	958 LDA #mess1 DIV 256	1448 EQUB 17
(IM	500 JSR message	968 STA &51	1458 EQUB 22
68 *FX138,8,128	518 JMP escape	970 JSR message	1460 EQUB 6
78 END	528 .BOS	988 LDY #9:JSR border	1478 EQUS *Ok*
88 MODE 6	538 CMP #1:BEQ bos	998 LDY #17: JSR border	1480 EQUB 0
98 linenum=&78	548 JMP (&238)	1000 LDA #mess2 MOD 256	1490 .notescape
100 key=472:char=473	550 .bos	1010 STA &50	1500 STA key
110 ptr=&74:len=&75	568 STX line:STY line+1	1828 LDA #mess2 DIV 256	1510 CMP #136
128 xpos=&76:ypos=&77	578 LDA #8: TAY: STA page	1838 STA &51	1520 BCC notcursorkeys
138 new=&78:line=&B	588 LDA &18:STA page+1		1538 JMP cursorkeys
140 temp=&52:page=&54	598 LDA (page+1),Y:BPL ok	1858 LDA #18:JMP window	1540 .notcursorkeys
150 getlna=497DF	600 RTS	1868 .message	1558 CMP #13
160 ptoken=&B50E	618 .ok	1878 LDY #8	1568 BNE notreturn
178 plnum8=4991F	628 LDA (line),Y:CMP #&@D	1880 .messloop	1570 JMP return
188 plnum5=49923	638 BNE 100p1	1898 LDA (&58),Y	1580 .notreturn
198 cston=&AC34	648 INY:STA (line),Y:DEY	1188 CMP #42:BEQ exitness	1598 CMP #127
200 schlin=&9970	658 LDA #48:STA (line),Y	1110 JSR &FFE3	1600 BNE wasinsert
210 inslin=&BC8D	660 .loop1	1128 INY	1610 JMP delete
228 tline8=48951	678 LDA (line),Y	1138 JMP messloop	1620 .wasinsert
230 PRINT' (D) isc or (C)a	688 STA &688,Y	1140 .exiteess	1630 JMP insert
ssette ?";:REPEAT: 6=6ET AND	698 CMP #&8D:BEQ convert	1150 RTS	1640 .getline
223:UNTIL6=68 OR 6=67	788 INY: JMP 100p1	1160 .border	1650 JSR copyline
248 IF 8=68 STARTX=4988 E	710 .convert	1178 LDX #8: JSR tab	1668 LDA #12: JSR &FFEE
LSE STARTX=4E00: +TAPE	728 STY &36	1188 LDX #39	1678 JSR printline
250 PRINTCHR\$6'	738 JSR cston	1198 .borderloop	1688 LDA #5:JSR window
268 FOR PASS=8 TO 2 STEP	740 JSR schlin	1200 LDA #255: JSR &FFEE	1698 LDX#23:LDY#8:JSR tal
	758 LDA &3D:STA line	1218 DEX	1788 LDY #1
2 OTO DY-CTARTY	768 LDA &3E:STA line+1	1228 BPL borderloop	1710 LDA (line),Y
278 PI=STARTI	778 BCS notfound	1238 RTS	1720 STA linenum+1
288 [OPT PASS	788 SEC:LDA line:SBC #3:S	1248 .window	1738 STA &28
298 SEI	TA line:LDA line+1:SBC #8:S	1258 PHA	1748 INY
388 LDA #4C	TA line+1	1268 LDA #28:JSR &FFEE	1758 LDA (line),Y
318 STA &F4:STA &FE85		1278 LDA #8:JSR &FFEE	1760 STA linenum
320 LDA #18	798 JMP restofprog 888 .notfound	1288 LDA #16:JSR &FFEE	1778 STA &2A
338 STA &F4:STA &FE85		1298 LDA #39:JSR &FFEE	1788 JSR plnue5
348 LDA &288	818 JSR find		1798 LDA \$18:JMP window
350 CMP #BOS MOD 256	828 .restofprog	1300 PLA	1880 .copyline
368 BNE notchanged	838 LDA #22: JSR &FFEE	1318 JMP &FFEE	1818 LDA &28E:STA &232
378 JMP escape	848 LDA #6:JSR &FFEE	1328 .tab	1820 LDA &28F:STA &233
380 .notchanged	858 LDA #214:LDX #2:LDY #	1338 LDA #31:JSR &FFEE	1838 LDA #newoswrch MOD2
398 STA &238	8:JSR &FFF4	1348 TXA: JSR &FFEE	1848 STA &28E
488 LDA &281	868 JSR screen	1350 TYA: JMP &FFEE	1040 31H 426C
418 STA &231	878 LDA#4:LDX#1:JSR&FFF4	1368 .edit	
428 LDA #BOS MOD 256	880 JSR getline	1378 LDA#21:LDX#8:JSR&FFF4	

BOS listing

From Page 29

1858 LDA #newoswrch DIV256 1868 STA 428F 1878 LDA #4:STA &A 1880 LDA #0:STA len 1890 .copyloop 1908 LDY &A 1910 LDA (line),Y 1920 CMP #40D 1930 BEQ exitcopy 1948 CMP #&8D 1950 BEQ unpack 1968 JSR ptoken 1970 INC &A 1980 JMP copyloop 1990 .unpack 2000 JSR getlna 2010 JSR plnua@ 2020 JMP copyloop 2030 .exitcopy 2040 JSR AFFEE 2050 LDA &232:STA &20E

2060 LDA &233:STA &20F 2070 LDA #0 2000 STA ptr 2090 STA xpos 2100 STA voos 2110 .newoswrch 2120 STA char 2130 PHP: TXA: PHA: TYA: PHA

2140 LDA char 2150 LDX len 2160 STA 4600.X 2178 INC len 2180 PLA: TAY: PLA: TAX: PLP 2198 LDA #8: JMP (&232) 2200 .printline

2210 LDX xpos:LDY ypos:JSR tab

2220 LDX ptr 2230 .01000 2240 LDA &600, X: CMP #&0D

2250 BEQ exitploop 2260 JSR &FFEE 2270 INX: JMP ploop

2280 .exitploop 2290 LDA #32: JSR &FFEE 2300 LDX xpos:LDY ypos:JMP

tab

2318 .insert

2320 LDA len: CMP #253 2338 BCC okinsert 2340 JMP been 2350 .okinsert

2360 LDX #&FE 2370 LDY #&FF

2380 .shuntup 2390 LDA &600.X:STA &600.Y

2400 DEX: DEY 2418 CPY ptr 2420 BNE shuntup 2438 LDX ptr

2440 LDA key 2450 STA &600, X 2460 INC ptr: INC len

2470 LDA key: JSR &FFEE 2480 JSR storetab

2490 JMP printline 2500 .delete 2518 LDA ptr

2520 BNE okdelete 2530 JMP beep

2548 .okdelete 2550 LDX ptr

2560 STX teap 2570 DEC temp 2580 LDY temp 2590 .shuntdown

2600 LDA &600, X:STA &600, Y

2618 CMP #&@D 2628 BEQ exitdelete 2630 INX: INY 2648 JMP shuntdown

2650 .exitdelete 2660 DEC ptr:DEC len 2678 LDA #8: JSR &FFEE 2680 JSR storetab 2690 JMP printline

2700 .storetab 2710 LDA #134: JSR &FFF4 2720 STX xpos:STY ypos

2730 RTS

2740 .cursorkeys 2758 CMP #136

2760 BNE checkright 2770 LDA ptr 2780 BNE okleft

2790 JMP beep 2800 .okleft

2818 LDA #8: JSR &FFEE

2820 DEC ptr 2838 RTS

2840 .checkright 2850 CMP #137 2860 BNE checkdown

2878 LDX ptr 2880 LDA &600.X 2898 CMP #&@D 2900 BNE okright

2910 JMP beep 2920 .okright

2930 LDA #9:JSR &FFEE

2948 INC ptr 2950 RTS 2960 .checkdown 2978 CMP #138: BNE up

2980 CLC:LDY #3:LDA (line) ,Y: ADC line: STA temp: LDA li ne+1:ADC #8:STA temp+1

2998 LDY #1

3000 LDA (temp).Y 3010 BPL okdown

3020 JMP beep 3030 .okdown

3040 LDA temp:STA line

3050 LDA temp+1:STA line+1

3060 JMP getline

3878 .up 3080 JSR find 3898 BCC doup 3100 JMP beep

3118 .doup 3120 JMP getline

3130 .find 3140 LDA line+1 3150 CMP page+1

3160 BNE okup 3170 LDA line

3180 CMP page

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3190 BNE okup 3200 SEC: RTS

3210 .okup

3228 LDA page:STA new 3230 LDA page+1:STA new+1

3248 .findloop

3250 LDA new: STA temp 3260 LDA new+1:STA temp+1

3278 LDY #3 3280 LDA (temp), Y 3298 CLC

3300 ADC temp 3318 STA new

3320 LDA temp+1

3338 ADC #8 3348 STA new+1

3350 LDA new: CMP line

3360 BNE findloop

3370 LDA new+1: CMP line+1 3380 BNE findloop

3390 LDA temp:STA line

3400 LDA temp+1:STA line+1

3410 CLC 3428 RTS 3430 .return 3448 LDX #8 3450 .replaceloop

3468 LDA &600.X:STA &700.X

3470 CMP #40D

3480 BEQ quitreplace

3498 INX

3500 JMP replaceloop

3510 .quitreplace

3528 LDA #8 3538 PHA

3540 TAY

3550 STA &37 3568 LDA #7

3578 STA &38 3580 JSR tline0 3590 PLA: TAY: TAX

3600 LDA linenum: STA &2A 3618 LDA linenum+1:STA &28

3620 JSR inslin

3638 LDA#213:LDX#198:LDY#8

:JSR&FFF4 3640 JSR beep

3650 LDA #213:LDX #100:LDY

#8: JSR &FFF4 3660 LDA #138 3670 JMP checkdown

3680 .beep 3698 LDA #7: JMP &FFEE

3700 .mess1

3710 EQUD 481110011

3728 EQUD &4280891F 3730 EQUS "OS EDITOR VERSI

ON 1.0"

3748 EQUD &88118111 3750 EQUB 42

3760 .mess2

3770 EQUD 428020B1F

3780 EQUS "c) Electron Use r .

3798 EQUD &4C858B1F

3800 EQUS "ine number:" 3818 EQUD &4315841F

3820 EQUS "SR KEYS Move: "

3838 EQUS "CR Enter: ESC Qu it*

3840 .mess3 3850 EQUD &FF17

3860 EQUD &FFFFFFF 3870 EQUD &2A0000

3888 1 3898 NEXT

3900 OSCLI ("SAVE BOS "+ST R\$*STARTX+" "+STR\$*PX)

3918 PRINT "NB-If you are

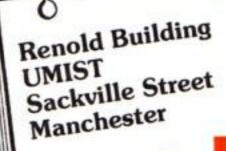
using this utility to edit"

3928 PRINT*programs on cas sette, PAGE must be set" 3938 PRINT*to &1288 or hig her (e.g. PAGE=&1200)*

3948 END

This listing is included in this month's cassette tape offer. See order form on Page 50.

Two shows Electron users shouldn't miss



New Royal Horticultural Hall Westminster London SW1

26-28

BBC MICRO

7-9

SEPTEMBER

10am-6pm, Friday September 26 10am-6pm, Saturday September 27 10am-4pm, Sunday September 28 NOVEMBER

10am-6pm, Friday November 7 10am-6pm, Saturday November 8 10am-4pm, Sunday November 9

Now in its fourth year, this big Northern autumn show will be the showcase for the whole range of new-season products being produced for the Electron & BBC Micro. Cut out your discount tickets and save 50p per head!

Strategically timed to coincide with the peak pre-Christmas buying period, this is the premier show for everyone involved in the Electron and BBC Micro world.

Your discount ticket for the Manchester Show

Your discount ticket for the London Show





Hand this voucher in at the door and save 50p off the normal admission price of £3 adults, £2 children.

10am-6pm, Friday September 26 10am-6pm, Saturday September 27 10am-4pm, Sunday September 28

Renold Building, UMIST, Sackville Street, Manchester



Hand this voucher in at the door and save 50p off the normal admission price of £3 adults, £2 children.

10am-6pm, Friday November 7 10am-6pm, Saturday November 8 10am-4pm, Sunday November 9

New Horticultural Hall, Westminster, London SW1 Never before have there been such money-saving offers for readers of a computer magazine!

XPAND your Electron

... for much, much less than the price you'd normally p





How the Plus 1 helps you rethe most of your Electron

With the Plus 1, you and your Electron enter a whole new computing dimension. The Plus 1 turns your Electron into a fully fledged micro capable of using printers, joysticks and cartridge ROMs – the software that comes on a chip. In addition, the Plus 1's analogue to digital port gives access to the outside world – while the slots for the ROM cartridges allow the Electron to take advantage of the latest, most exciting hardware developments yet to be released.

If you want to use your Electron to the full, then it's essential you get a Plus 1.

Normal

Spec for re Electi

£3

Inc. FI

EXPAND - with the Electron Word

Convert your Electron into a sophisticated word process packed combination. The package consists of the versal together with View, Acom's custom designed word process cartridge and the many powerful capabilities of View become Whether you're writing a simple letter or your first novel—the Plus 1 make an unbeatable combination.

Normal price £82.80

Electron Use

EXPAND - with the Electron We

Now you can transform your Electron into a serious mich Workstation. This package consists of a Plus 1 and 3 wordprocessor and Viewsheet spreadsheet, both on car Workstation makes the Electron a hard working yet inexpe and office. From business letters to a set of invoices, from heash flow crises, it can take them all in its stride.

Normal price £119.80

Electron User

All prices include VAT and carriage. All offers subject to availability.

Please use the order form o



nake

orice £59.90

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9.95

REE game cartridge

d Processor!

ssor with this value le Plus 1 interface, ssor. Just plug in the ne instantly available. you'll find View and

r price £49.95

rkstation!

e acclaimed View irtridge ROMs. The ensive tool for home home economics to

r price £59.95

on Page 53

EXPAND - with the under-£100 Plus 3!

The Plus 3 expansion unit provides you with a disc drive and disc interface in one compact unit. It consists of a single sided 80 track drive and ADFS, and can store up to 320k of data on each 3½in disc with no limit to the number of files. Expansion ports at the rear of the unit enable a Plus 1 to be added and a second drive can be attached which can be either 5½in or 3½in, 40 or 80 track.

The Plus 3 comes complete with a Welcome disc packed full of games, demonstrations, utilities and help files, plus a 111 page manual containing everything you need to get you started right away.

Normal price £219.00

Electron User price £99.95

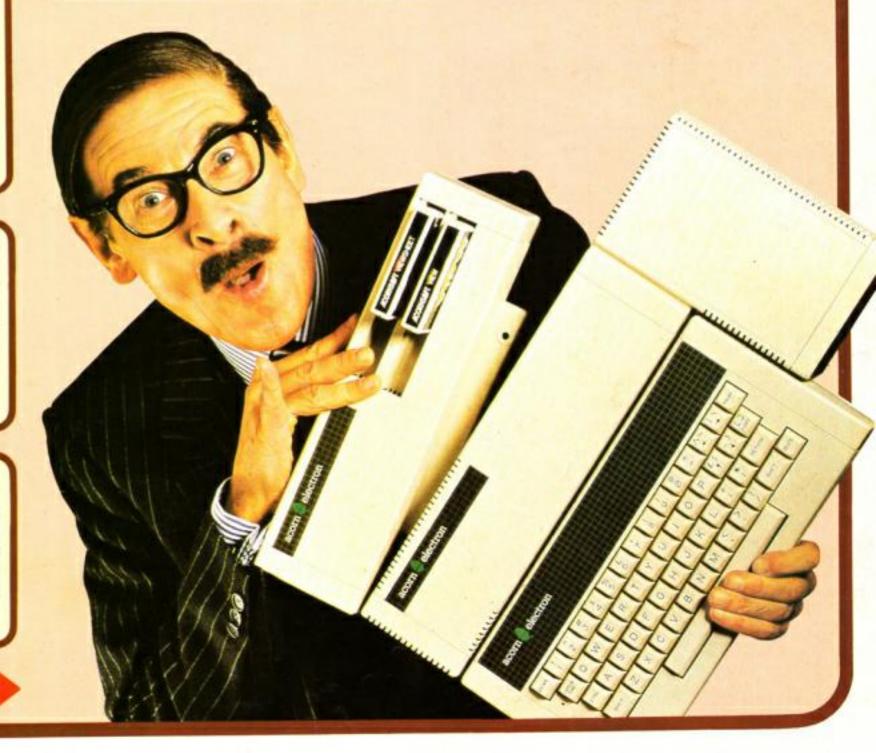
... or a Plus 3 PLUS Database!

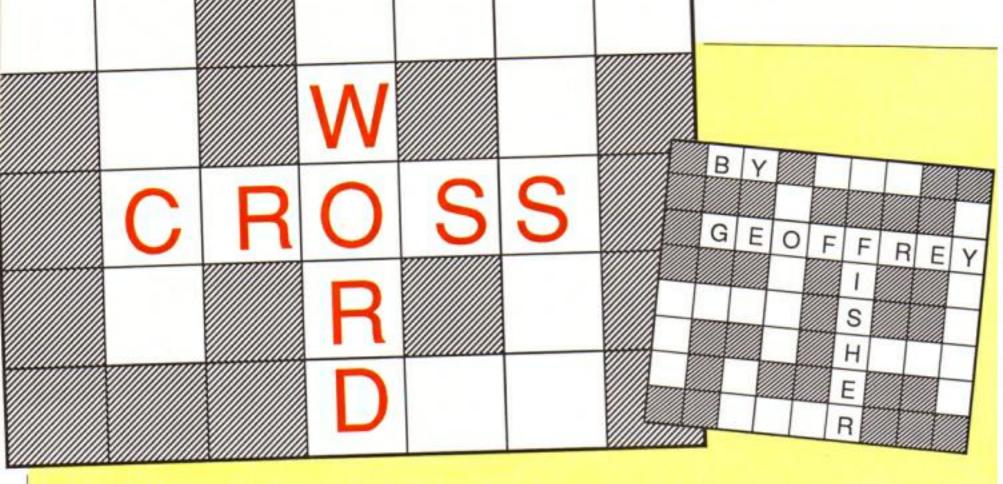
Bring the speed of discs and the organised memory of a powerful database to your Electron with the Electron Database combined with the Plus 3 disc drive, this dynamic duo should provide the answer to all your dataprocessing needs.

The database has all the facilities any normal user, home or business, would need. Yet – thanks to its menu-driven structure—it's simplicity itself to use. Records can be as varied as you require: You can have up to 32 fields ranging from 2 to over 200 characters in size. Once you've entered the records, information can be recovered with the minimum of fuss, sorting and searching over any number of fields. And when you've created your record structure you're not stuck with it: Field sizes can be changed at will. So, if your interested in keeping records, do yourself a favour: Upgrade to the Electron Database and let your micro do the work.

Normal price £248.95

Electron User price £114.95





CROSSWORD consists of two programs, Setter and Solver. The first can be used to create a grid for a puzzle of your own design, along with suitable clues.

This can then be saved as a file and loaded into Solver which, as its name suggests, is an on-screen aid to working out the answers.

On entering Setter the first decision is whether to load a previously saved crossword file or to create a new one.

Any file loaded must have been originally created using Setter. Type the filename when asked and press Return.

The data will be loaded in similar fashion to a Basic program and the name must conform to the general filename rules.

To create a puzzle from scratch the first piece of information required is the size of the crossword grid. The minimum size is two squares by two and the maximum 14 by 14, although a perfectly square grid is not compulsory.

When the prompt "Across =" appears type the number of squares equal to the grid width and after the prompt "Down =" the number of squares equal to the grid height pressing Return after each.

If the figures given are out of range Return will be ignored and you will be forced to use the Delete key.

When prompted "Satisfied (Y/N)" press Y to continue and N or any other character to cancel and re-enter.

A crossword grid will be drawn in accordance with the parameters and filled with filler squares. Letters are

printed both underneath and down the lefthand side of the grid but these need not concern you at the moment. We'll return to them later.

On the prompt "Build crossword now" design the grid which need not be the symmetrical design of most professional ones. The keys used are shown in Figure I.

When Control + F is typed the computer counts the number of clues required both across and down.

If either of these figures is zero you will be sent, accompanied by a raspberry. to the start menu.

Another error causing a rude interruption at this point might be an isolated letter. It would be a strange crossword indeed with single letters scattered around and it would also cause havoc in the solving program.

However you are allowed to build two or more crosswords separately in the same grid. Again strange, but this time acceptable.

If the Electron is satisfied that both the above rules have been satisfied it will highlight the entries one by one and request a clue for each.

Any character may be typed for a clue, but there must be at least one which is not a space and no more than 114

characters in all. Press Return when satisfied with each clue.

Before doing so press Control + W, which is more important than first appears.

It is assumed that the clue just typed is one long chunk of text and that the end of a line is not to be taken as the end of a word.

After Control + W the line will be organised - it may be all right as it stands - so that no words are split between lines. The end of a line is now taken to be the end of a word and in the print option it will

If there are odd spaces in the printer output of the clues the blame probably lies in failure to press Control + W at the clue entry stage.

When all the clues are entered, or alternatively after a file has been loaded, a second menu is presented. It has the following four options:

- EXIT: The program is terminated.
- SAVE: Crossword information is stored on tape or disc. For this purpose a name is required to identify it, which must consist of between one and 10 characters.

Type the name and press Return. The process then continues as for recording a Basic program.

PRINT: First select whether

Key Letters A to Z

Space

Cursor keys

Control + A

Control + D

Control + F

Action

Prints that letter in the grid at the cursor position overwriting what is already there. The cursor will skip one square if it is not at the edge of the grid. Lower case letters will be changed to capitals.

As above except prints filler square.

The cursor inverts the contents of the square in which it is present. It is made to skip one square in the direction of the cursor arrow and cannot be forced off the grid.

After a letter is typed the cursor skips one square right if it is not already at the extreme right of the grid - default. A half arrow beside the grid always points in the skip direction.

After a letter is typed the cursor skips one square down if it is not already at the bottom of the grid. If the direction of skip is changed the half arrow will be repositioned.

Enter this when the design is complete.

Figure 1: Control keys for crossword creation

Action

Key Control + F

Control + R

Quit this section. Return

Show next clue. If last, show first again. Redo clue showing. Enter new clue as before.

Figure II: Control keys for check routine

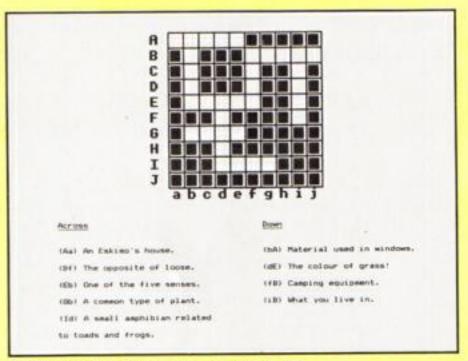


Figure IV: Sample printout created with Setter

the crossword is to be printed with the answers still in place or with only filler squares. Press Y for the latter. Ready the printer, press Return and then wait.

 CHECK: The three main keys available here are shown in Figure II.

Finally a note on how the clue lettering system works. Each clue is represented by a capital and a lower case letter. The capital precedes the lower case for an across clue, and the lower case the capital for a down clue - for example, Aa or

Each row and column of the crossword has been given a letter which is printed outside the grid. Rows have capitals and columns lower case let-

Look at the first letter of the required clue's answer and note its row and column. Follow that row across to obtain the capital and that column down to obtain the lower case letter. These letters label the clue.

Figure III: Control keys for Solver

Key

Escape

Control + F

Cursor keys

Control + A

Control + D

Letters A to Z

Control + cursor

Shift + cursor

Action

forced off the grid.

bottom of the grid.

on to the grid.

right-hand text window.

left-hand text window.

Checks whether crossword is complete.

The cursor, an open square box, is manipulated by these keys in the direction of the key's arrow. It cannot be

After a letter is typed the cursor will skip one square right if it is not already at the

After a letter is typed the cursor will skip

one square down if it is not already at the

Prints that letter in the grid at the cursor position overwriting what is already there - except over filler squares where nothing happens. The cursor will skip according to Control + A/D. Small letters will be changed to capitals before entry

Manoeuvres the down clues in the

Manoeuvres the down clues in the

Prints answers for baffled solver.

extreme right of the grid - default.

To use Solver select a crossword saved from Setter, type its name when asked and press Return. The data will be loaded in similar fashion to a Basic program.

A grid is printed according to the parameters input and you can try out your answers by moving the cursor to the

appropriate place on the grid and then typing them in. The keys used are shown in Figure

The Electron does not continually check for a completed crossword, so it is important to press Control + F if you think it complete.

The correspondence of a clue to the grid is given by the clue letters. See Setter's instructions for an explanation of the clue letter system.

CROSSWORD SETTER

10 REM Crossword Setter

20 REM By G.Fisher

30 REM (c) Electron User

40 MODE4: ONERRORGOTO160

50 VDU19,1,2;0;:DIM SS% 196: OSCLI "FX4,1"

60 PROCmenu1: IFopt%=1THE NPROCinfin ELSEPROCparamete r:PROCgrid:PROCcompile:PROC cluecount

78 ONERRORGOTO158

80 REPEAT: PROCmenu2

90 IFopt%=1THENPROCinfou

100 IFopt%=2THENPROCgrid: PROCprint

110 IFopt%=3THENPROCgrid: PROClookup

128 UNTILopt%=8

130 MODE6: OSCLI "FX4"

140 PRINTTAB(0,8); "Goodby

e":END

150 DSCLI"FX3": VDU3: IFERR

=17THEN88

160 IFERR=170RERR=222THEN

SOUND0,-15,4,20:RUN

178 REPORT: PRINT" at line

": ERL: END

180 DEF PROCgrid

198 LOCALCX, RX, R2X, C2X: CL

200 C1%=639-ACROSS%*24:C2 %=639+ACROSS%+24:R1%=688-D0 WNX #22: R2% = 688 + DOWNX #22

210 VDU28,10,31,28,23

228 GCOL8,1:FORCX=8TOACRO SSZ: MOVEC1X+CX+48.R1X: DRAWC 1%+C%+48,R2%:NEXT

230 FORRX=@TODOWNX: MOVEC1 %,R1%+R%+44:DRAWC2%,R1%+R%+ 44: NEXT

240 GCOL3.1: VDU5: FORR%=1T ODOWNX: MOVEC1X-62,R1X+(DOWN %-R%) *44+36: VDU64+R%: NEXT

250 FORC%=1TOACROSS%: MOVE C1%+(C%-1) *48+5, R1%-4: VDUC% +96:NEXT

260 VDU23,159,255,255,255 ,255,255,255,255,255

270 PROCblank (32)

280 VDU4: ENDPROC

290 DEF PROCcompile

300 LOCALAX, BX, CX, RX: GCGL

3,1

310 BX=137:PRINTTAB(0,4); "Build crossword now"::C%=1 :RX=1:VDU5:GDSUB448

320 REPEAT: PROCcursor (C1% +(CX-1)*48,R1X+(DOWNX-RX)*4

4): AX=GET 338 PROCcursor (C1%+(C%-1) *48.R1%+(DOWN%-R%)*44):IFA%

=32THENAX=159:PROCchalkin 340 IFAX>96ANDAX<123THENA

%=A%-32 350 IFAX>64ANDAX(91THENPR

OCchalkin 360 IFAX=136ANDCX>1THENCX

=CX-1 370 IFAX=137ANDCX<ACROSSX

THENCX=CX+1 380 IFAX=138ANDRX<DOWNXTH

ENR%=R%+1

390 IFAX=139ANDRX>1THENRX =RX-1

400 IFAX=1ANDBX=138THENGO SUB450: B%=137: 60SUB440

410 IFAX=4ANDBX=137THENGO SUB440: BX=138: GOSUB450

420 UNTILAX=6: IFBX=137THE NGOSUB448 ELSEGOSUB458

430 VDU4: ENDPROC

448 MOVE572,R1X-48: DRAW78 8.R1%-48:DRAW664.R1%-60:RET URN

450 MOVEC1%-78,756: DRAWC1 %-78.620: DRAWC1%-90.664: RET URN

460 DEF PROCeursor (CT%, RT

478 MOVECT%+5,RT%+36:VDU2 55: ENDPROC

480 DEF PROCchalkin

498 LOCALCTZ.RTZ:CTZ=C1Z+ (C%-1) *48+5: RT%=R1%+(DOWN%-

RX) #44+36 500 MOVECTX, RTX: VDU? ((RX-

1) *ACROSSX+CX-1+SSX) .8.AX

518 ?(SSX+(RX-1) +ACROSSX+ C%-1)=A%:A%=B%

520 ENDPROC

530 DEF PROCcluecount:LOC ALCX,RX,KTX,CHX:CAX=0:CDX=0 :CLS

From Page 35

540 FORRX=1TODOWNX:KTX=0: FORCX=1TOACROSSX:CHX=(RX-1) *ACROSSX+CX+SSX-1

550 IF?CH%=159ANDKT%>1TH ENCA%=CA%+1

560 IF?CH%()159THENKT%=KT %+1ELSEKT%=0

570 NEXT: IFKTX>1THENCAX=C AX+1

580 NEXT

598 FORC%=1TOACROSS%:KT%= 0:FORR%=1TODOWN%:CH%=(R%-1) +ACROSS%+C%+SS%-1

600 IF?CHX=159ANDKTX>1THE NCDX=CDX+1

618 IF?CHX(>159THENKTX=KT X+1ELSEKTX=8

620 NEXT: IFKTX>1THENCDX=C DX+1

638 NEXT

648 CLS:PRINT"Across clue s ":STR\$(CAX):PRINT"Down cl ues ":STR\$(CDX)

650 DIM LL\$(CAX+CDX):KTX= 0:LLX=0

660 FORRX=1TODOWNX:FORCX= 1TOACROSSX:CHX=(RX-1)*ACROS SX+CX-1+SSX:IFFNitest THENK TX=KTX+1

670 NEXT: NEXT

580 IFKT%) OTHENCLS:PRINT*
Isolated letter"::SDUNDO,
-15,4,10:FORKT%=1T09000:NEX
T:*FX125

698 IFCAX=80RCDX=8THENCLS :PRINT"Insufficient clues"; :SOUND8,-15,4,18:FORKTX=1TD 9888:NEXT:*FX125

700 PROCcluesin: ENDPROC 710 DEF FNitest: IF?CHZ=15 9THEN=FALSE

720 IFR%)1AND?(CH%-ACROSS %)()159THEN=FALSE

730 IFR%<DOWN%ANDCH%7ACRO SS%<>>159THEN=FALSE

748 IFC%>1AND?(CH%-1)(>15 9THEN=FALSE

750 IFC%(ACROSS%ANDCH%?1()159THEN=FALSE

768 =TRUE

778 DEF PROCelussin

780 LOCALCZ, RX, KTZ, CHZ

790 FORRX=1TODOWNX:KTX=0:

FORCX=1TOACROSSX:CHX=(RX-1)
+ACROSSX+CX+SSX-1

980 IF?CHX=159ANDKTX>1THE NCX=CX-KTX:PROCafill:PROCge tclue:PROCafill:CX=CX+KTX:K TX=8

810 IF?CH%<>159THENKT%=KT %+1ELSEKT%=0

920 NEXT: IFKTX>1THENCX=CX -KTX:PROCafill:PROCgetclue: PROCafill:CX=CX+KTX

830 NEXT

940 FORCX=1TOACROSSX:KTX= 8:FORRX=1TODOWNX:CHX=(RX-1) *ACROSSX+CX+SSX-1

850 IF?CH%=159ANDKT%>1THE NR%=R%-KT%:PROCdfill:PROCge tclue:PROCdfill:R%=R%+KT%:K T%=8

868 IF?CHX<>159THENKTX=KT X+1ELSEKTX=0

878 NEXT: IFKTX>1THENRX=RX -KTX: PROCdfill: PROCgetclue: PROCdfill: RX=RX+KTX

988 NEXT

998 ENDPROC

900 DEF PROCeetclue

910 LOCALST\$, AX, MD\$: IFLL% >=CAXTHENST\$=CHR\$(96+C%)+CH R\$(64+R%)ELSEST\$=CHR\$(64+R%))+CHR\$(96+C%)

920 CLS:PRINT*Clue ";ST\$: WD\$=""

938 REPEAT: AX=GET: IFAX=12 7ANDLEN(WD\$)>8THENWD\$=LEFT\$ (WD\$,LEN(WD\$)-1): VDUAX

948 IFAX=23THENPROCWORDER
ap

958 IFAX>31ANDAX<127ANDLE N(WD\$)<114THENWD\$=WD\$+CHR\$(AX):VDUAX

968 UNTILAX=13ANDWD\$()""A
NDWD\$()STRING\$(LEN(WD\$),"
):LLX=LLX+1:LL\$(LLX)=ST\$+RI
GHT\$(STR\$(KTX+100),2)+RIGHT
\$(STR\$(LEN(WD\$)+1000),3)+WD

978 ENDPROC

980 DEF PROCHORDWRAP:LOCA LTZ,ZX,T\$,B\$:B\$="":TX=1:CLS 990 FORZX=1TOLEN(ND\$):T\$= MID\$(ND\$,ZX,1)

1000 IFT\$=" "THENTX=TX+1 E LSETX=0

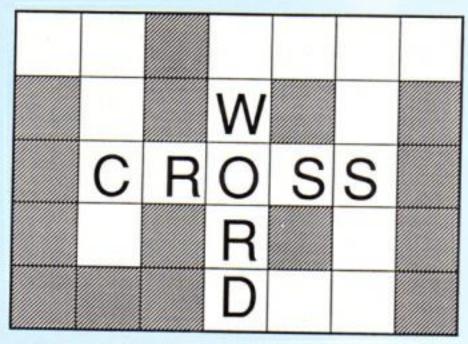
1818 IFT%(2THENB\$=B\$+T\$
1828 IFFNtest(T\$)THENB\$=B\$

+" ":TX=1

1838 NEXT: WD\$= ""

1848 WD\$=WD\$+LEFT\$(B\$,19): WD\$=LEFT\$(WD\$,114):PRINTTAB (8,1);WD\$;:IFLEN(B\$)(=19THE NENDPROC

1858 B\$=RIGHT\$(B\$, LEN(B\$)-



19):IFB\$=STRING\$(LEN(B\$),"
")THENENDPROC

1860 IFLEFT\$(B\$,1)=" "THEN REPEAT:B\$=RIGHT\$(B\$,LEN(B\$) -1):UNTILLEFT\$(B\$,1)()" ":G DT01848

1878 TX=-1:REPEAT:TX=TX+1: UNTILMID\$(WD\$,LEN(WD\$)-TX,1)=" "ORTX=19

1888 IFTX)8ANDTX(19THENTS= RIGHT\$(WD\$,TX):MD\$=LEFT\$(WD \$,LEN(WD\$)-TX)+STRING\$(TX," "):8\$=T\$+8\$

1098 GOTO1848

1100 DEF FNtest(M\$):IFM\$="
!"ORM\$="-"ORM\$="?"ORM\$=";"O
RM\$=":"ORM\$=","ORM\$="."THEN
=TRUE ELSE=FALSE

1118 DEF PROCLookup

1128 LOCALRX,CX,AX,KTX,LPX,A\$,B\$:+FX21

1130 CLS:PRINT" You can no w check":PRINT" through the clues"

1140 PRINT'" Press return now"::LPX=0

1150 REPEAT: AX=GET: UNTILAX =130RAX=6: IFAX=6THENENDPROC 1160 REPEAT: LPX=LPX+1: IFLP X>LLXTHENLPX=1

1178 A\$=LEFT\$(LL\$(LP%),2): CLS:PRINT*Clue = ";A\$:B\$=RI GHT\$(A\$,1):A\$=LEFT\$(A\$,1)

1180 KTX=VAL(MID\$(LL\$(LPX),3,2)):PRINTRIGHT\$(LL\$(LPX)

LEN(LL\$(LP%))-7); 1190 IFLP%(=CAXTHENC%=ASC(

B\$)-96:R%=ASC(A\$)-64:PROCaf 111 ELSE R%=ASC(B\$)-64:C%=A SC(A\$)-96:PROCdfill

1200 REPEAT: AX=GET: UNTILAX =130RAX=180RAX=6

1210 IFAX=18THENLLX=LPX-1:

1220 IFLP%(=CA%THENPROCafi
11 ELSE PROCdfill
1230 UNTILA%=6
1240 ENDPROC
1250 DEF PROCafill:LOCALTK
%:IFKT%=0THEN1270
1260 VDU5:FORTK%=0TOKT%-1:
PROCcursor(C1%+(C%-1+TK%)+4
8,R1%+(DOWN%-R%)+44):NEXT
1270 VDU4:ENDPROC

PROCgetclue:LL%=CAX+CDX

1280 DEF PROCHFill:LOCALTK
%:IFKT%=@THEN1300

1298 VDU5:FORTKX=8TOKTX-1: PROCcursor(E1X+(CX-1)*48,R1 X+(DOWNX-RX-TKX)*44):NEXT

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1300 VDU4: ENDPROC

1310 DEF PROCparameter:LOC ALA\$,KT%

1320 REPEAT: CLS: PRINTTAB(1 5,3); "PARAMETERS": PRINTTAB(15); "========"

1330 PRINTTAB(15,9); "Acros s = ":: ACROSS%=FNinpar

1348 PRINTTAB(17,13); *Down

= ";:DOWNX=FNinpar

1350 PRINTTAB(12,22); "Sati sfied(Y/N)?";:A\$=GET\$:UNTIL INSTR("Yy",A\$)>0

1360 \$SSX=STRING\$(196,CHR\$
(159)):ENDPROC

1378 DEF PROCinfout:LOCALA

1388 REPEAT: CLS: PRINTTAB(1 8,3); "I am ready to record" : PRINTTAB(12); "the informat ion"

1398 PRINT TAB(11); "What w ill you call":PRINTTAB(13); "this crossword": PRINTTAB(1 1); "(Max len 18 chrs) ": INPU TTAB (15, 16); ">"; X\$: UNTILLEN (X\$) >@ANDLEN(X\$) <=18 1400 A=OPENOUT X\$:PRINT# A .ACROSS%,DOWN%,CA%,CD% 1410 SSX?196=13:PRINT# A.\$ SSI 1428 FORKTX=1TOLLX:PRINT# A.LL\$(KT%):NEXT:CLOSE# A 1430 ENDPROC 1440 DEF FNinpar: LOCALAX, V %, B\$: B\$="" 1458 REPEAT: AX=BET: VX=VAL (B\$) 1460 IFAX>47ANDAX<58ANDLEN (B\$) (2THENB\$=B\$+CHR\$(A%):VD UAZ 1470 IFAX=127ANDLEN(B\$)>0T HENVDUAZ: B\$=LEFT\$ (B\$, LEN (B\$ 1480 UNTILAX=13ANDVX>1ANDV %(15:=V% 1498 DEF PROCmenu2: VDU26,1 2:PRINTTAB(17,5); "MENU 2":P RINTTAB(17); "======" 1500 PRINT 'TAB(16); "8. Ex it":PRINT'TAB(16);"1. Save" :PRINT'TAB(16):"2. Print":P RINT'TAB(16): "3. Check": PRI NT' 'TAB(14); "Press 8 to 3" 1510 REPEAT: opt%=6ET-48:UN TILopt%>=@ANDopt%(4:ENDPROC 1528 DEF PROCmenul: VDU26,1 2: PRINTTAB(17,5); "MENU 1":P RINTTAB(17); "=====" 1538 PRINT' TAB(15); "1. Re load":PRINT'TAB(15);"2. Cre ate":PRINT'''TAB(14):"Press 1 or 2"::REPEAT:opt%=GET-4 8:UNTILopt%>@ANDopt%<3:ENDP ROC 1540 DEF PROCecode: LOCALIX 1550 FORIX=0TO2STEP2 1560 P%=&C00 1570 [OPT IX 1588 LDA#228:STA&78 1590 LDA#8:STA&71 1600 .P1 LDA%70:CLC 1618 ADC#4: STA&78 1620 BCC P2: INC&71 1630 .P2 LDA&70:BNE P3 1640 LDA&71: CMP#4: BEQ fin 1650 .P3 LDA#8:STA#75 1660 LDA#128:STA&76 1678 LDA&7A:STA&72

1680 LDA&78:STA&73 1690 .P4 LDA&72:SEC 1700 SBC#2:STA&72 1710 BCS P5: DEC&73 1720 .P5 LDX#&70:LDY#0 1730 LDA#9: JSR&FFF1 1740 LDA&74: BEQ P6 1750 LDA&75: ORA&76: STA&75 1760 .P6 LDA&76:LSR A 1778 STA&76: BNE P4 1788 LDX#3 1798 .P7 LDA#1:JSR&FFEE 1800 LDA&75: JSR&FFEE 1818 DEX: BNEP7 1820 LDA#0: BEQ P1 1830 .fin RTS 1840] 1850 NEXT 1860 ENDPROC 1870 DEF PROCprint: LOCALLI ,NAI,NDZ,rZ,TZ,baZ,A\$,C\$:CL S:PROCacade 1888 CLS:PRINTTAB(4); "Do y ou want":PRINTTAB(3): "a bla nk grid?":PRINTTAB(7);"(Y/N 1": 1890 REPEAT: AS=GETS: TX=INS TR("YyNn",A\$):UNTILT%>8:IFT %(3THENPROCblank(159):ba%=1 ELSEbn%=@ 1988 CLS: PRINTTAB(3); "Read y printer":PRINT'TAB(3); "Pr ess return"::REPEAT:UNTILGE T=13 1918 LX=18: *FX6,127 1928 CLS: PRINTTAB(5); *Prin ting";: VDU2,1,27,1,65,1,8 1938 FORr%=712+DOWN%*22TOR 1%-36STEP-16: 1&7A=r%+2 1948 FORTX=1T015: VDU1,32:N 1950 VDU1.27,1,76,1,88,1,2 :CALL&C00:IFLX=10THENVDU1.L 1968 NEXT: VDU1, 27, 1, 58, 3: I Fbm%>0THENPROCblank(159) 1970 OSCLI*FX3,10*: VDULX,L %: PROChead (4. "Across"): PROC head (34, "Down"): VDU10, 13, L% 1980 NAX=8:NDX=0:A\$="":C\$= "": REPEAT 1990 IFA\$=""THENPROCPlinea 2000 IFC\$=""THENPROCplined 2010 PRINTSPC(4); LEFT\$(A\$, 32); SPC(8); LEFT\$(C\$,32) 2020 IFLEN(A\$)>32THENA\$=RI GHT\$(A\$,LEN(A\$)-32) ELSEA\$=

2030 IFLEN(C\$)>32THENC\$=RI

GHT\$(C\$,LEN(C\$)-32) ELSEC\$= 2848 UNTILNAX=CAXANDNDX=CD %ANDA\$=""ANDC\$="" 2050 OSCLI"FX3": ENDPROC 2060 DEF PROChead (S%, mess\$):PRINTSPC(S%);:VDU27,45,1: PRINTmess\$:: VDU27,45,0:ENDP ROC 2870 DEF PROCplinea: IFNAX= CAXTHENA\$=STRING\$(32," "):E NDPRDC 2000 NAX=NAX+1:A\$=FNcommon (NA%): ENDPROC 2090 DEF FNcommon (NX):LOCA LB\$.T\$.A\$.T%.Z%:A\$=RIGHT\$(L L\$(NX), LEN(LL\$(NX))-7):B\$=" ("+LEFT\$(LL\$(N%),2)+") ":T% =1 2188 FORZX=1TOLEN(A\$):T\$=M ID\$(A\$, Z%, 1) 2110 IFTS=" "THENTX=TX+1EL SETX=0 2128 IFT%<2THENB\$=8\$+T\$ 2138 IFTX=BANDZXMOD19=BTHE NB\$=B\$+" ": T%=1 2140 NEXT: A\$= "" 2158 A\$=A\$+LEFT\$(B\$,32): IF LEN(B\$)=32THEN=A\$ 2160 IFLEN(B\$) (32THEN=A\$+S TRING\$ (32-LEN (B\$), " ") 2178 B\$=RIGHT\$(B\$, LEN(B\$)-32): IFB\$=STRING\$(LEN(B\$)," ") THEN=A\$ 2180 IFLEFT\$(B\$,1)=" "THEN REPEAT: B\$=RIGHT\$ (B\$, LEN (B\$) -1):UNTILLEFT\$(B\$,1)<>" ":6

OT02158

NDPROC

2198 TX=-1:REPEAT:TX=TX+1:

UNTILMIDS (AS, LEN (AS) -T%, 1) =

2200 IFT%>0THENT\$=RIGHT\$(A

\$.T%):A\$=LEFT\$(A\$,LEN(A\$)-T

%)+STRING\$(T%," "):B\$=T\$+B\$

2220 DEF PROCplined: IFND%=

2230 NDX=NDX+1:C\$=FNcommon

2240 DEF PROCblank(IX):LOC

2250 FORRX=1TODOWNX:FORCX=

1TOACROSSX: TX=?((RX-1) +ACRO

2260 IFT%(>I%THENMOVEC1%+(

C%-1) *48+5, R1%+(DOWN%-R%) *4

2278 NEXT: NEXT: VDU4: ENDPRO

ALCX,RX,TX:VDU5:6COL3,1

CD%THENC\$=STRING\$(32." "):E

2210 GOTO2150

(NDX+CAX): ENDPROC

SS%+C%-1+SS%)

4+36: VDUTI

n B C D E F G н 1 abcdefghij

C

X\$.A\$.KT%

2280 DEF PROCinfin: LOCALA,

2290 REPEAT: CLS: PRINTTAB(1

1.3); "I am ready to load": P

RINTTAB(13); "the crossword"

:PRINTTAB(14); "information"

2388 PRINTTAB(13,9); "Which

crossword":PRINTTAB(13);"d

o you require":PRINTTAB(12)

:"(Max len 10 chrs)": INPUTT

AB(15,14);">"; X\$:UNTILLEN(X

2318 A=OPENIN X\$: INPUT# A.

ACROSS%, DOWN%, CA%, CD%: INPUT

2320 LLX=CAX+CDX: DIMLL\$(LL

2330 REPEAT: INPUT# A, A\$: IF

VAL (MID\$(A\$,5,3)) <> LEN(A\$) -

2340 KTX=KTX+1: IFKTX(=LLXT

2350 UNTIL EOF# A:CLOSE# A

2368 IFKT%()LL%THEN*FX125

\$) >@ANDLEN(X\$) <= 10

A.A\$: \$(SS%) =A\$

%):KT%=8

7THEN+FX125

HENLL\$ (KT%) =A\$

2370 ENDPROC

CROSSWORD SOLVER

18 REM Crossword Solver 28 REM By G. Fisher 30 REM (c) Electron User

48 MODE4: DIM S1% 196: DIM S2% 196

50 OSCLI"FX4,1": VDU19,1, 2:0::ONERRORGOTO820

60 PROCINTIN: ONERRORGOTO 848

78 PROCgrid: ONERRORGOTOB

80 PROClookup: MODE6: OSCL I"FX4":PRINTTAB(0,12); Good

bye": END 90 DEF PROCGrid: LOCALC%, RI,RZI,CZI,CHI:CLS

100 C1%=639-ACROSS%+24:C2 %=639+ACROSS%*24:R1%=688-D0

From Page 37

WNX #22: R2X=688+DOWNX #22

110 VDU28,0,31,18,23 120 GCOL0,1:FORCX=0TOACRO SSX:MOVEC1X+CX+48,R1X:DRAWC 1X+CX+48,R2X:NEXT

138 FORRX=8TODOWNX:MOVEC1 %,R1X+RX+44:DRAWC2%,R1X+RX+ 44:NEXT

148 GCOL3,1:VDU5:FORRX=1T ODOWNX:MOVEC1X-62,R1X+(DOWN X-RX)+44+36:VDU64+RX:NEXT

158 FORCX=1TOACROSSX: MOVE C1X+(CX-1) #48+5,R1X-4:VDUCX +96:NEXT

160 VDU23,159,255,255,255 ,255,255,255,255,255,23,150 ,255,129,129,129,129,129,12 9,255

170 SCOL0,1:FORRX=1TODOWN X:FORCX=1TOACROSSX:CHX=?((R X-1)*ACROSSX+CX-1+S1X):MOVE C1X+(CX-1)*48+5,R1X+(DOWNX-RX)*44+36:VDUCHX:NEXT:NEXT

188 MOVE8,292:PLOT21,1279
,292:MOVE612,8:PLOT21,612,2
92:MOVE668,8:PLOT21,668,292
:GCOL3,1:MOVE64,324:PRINT"a
cross";STRING\$(6,CHR\$(8));S
TRING\$(6,CHR\$(255)):MOVE186
5,324:PRINT"down";STRING\$(4,CHR\$(255));

190 VDU4: ENDPROC

200 DEF PROCcursor(CT%,RT%):MOVECT%+5,RT%+36:VDU5,25 4,4:ENDPROC

210 DEF PROCchalkin:LOCAL CTX.RTX.TX:TX=?((RX-1)*ACRO SSX+CX-1+S1X):IFTX=159THENE NDPROC

220 CT%=C1%+(C%-1)+48+5:R
T%=R1%+(DOWN%-R%)+44+36:MOV
ECT%,RT%:VDU5,T%,8,A%,4

238 ?(S1%+(R%-1)*ACROSS%+ C%-1)=A%:A%=B%:ENDPROC

248 DEF PROCup1: IFNAX<2TH ENENDPROC

250 NAX=NAX-1:LOCALNNX:IF adX=1THENGOSUB400

260 NNX=6+VAL(MID\$(LL\$(NA X+1),5,3))DIV19+VAL(MID\$(LL \$(NAX),5,3))DIV19:60SUB420: PROCclueout(NAX):ENDPROC

270 DEF PROCup2:IFND%<2TH ENENDPROC

280 LOCALNNX:NDX=NDX-1:IF adX=0THENGOSUB410 298 NNX=6+VAL(MID\$(LL\$(ND X+1+CAX),5,3))DIV19+VAL(MID \$(LL\$(NDX+CAX),5,3))DIV19:G OSUB428:PROCclueout(NDX+CAX):ENDPROC

300 DEF PROCdown1:IFNA%>= CAXTHENENDPROC

310 IFadX=1THENGOSUB400

320 NAX=NAX+1:PROCclueout (NAX):ENDPROC

338 DEF PROCdown2: IFND%>= CD%THENENDPROC

340 IFad%=0THENGOSUB410

350 NDX=NDX+1:PROCclueout (NDX+CAX):ENDPROC

368 DEF PROCclueout(c1%) 378 COLOUR8:COLOUR129:PRI NTLEFT\$(LL\$(c1%),2);:COLOUR 1:COLOUR128

388 PRINT'RIGHT\$(LL\$(c1%), LEN(LL\$(c1%))-7)'

398 ENDPROC

400 ad%=0:vp2%=VPOS:VDU28
.0,31,18,23,31,0,vp1%:RETUR

410 adX=1:vp1X=VPOS:VDU28 ,21,31,39,23,31,0,vp2X:RETU RN

420 REPEAT: VDU11: NNX=NNX-1: UNTILNNX=0: RETURN

438 DEF PROCeursor (HUEX, C TX,RTX)

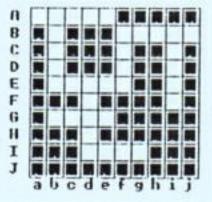
448 MOVECTX,RTX:SCOL0,HUE X:DRAWCTX+72,RTX:DRAWCTX+72 ,RTX+48:DRAWCTX,RTX+48:DRAW CTX,RTX:ENDPROC

450 DEF FNfin:LOCALKTX,NX ,DX,OKX:OKX=0

460 FORKTX=0TOACROSSX+DOW NX-1: IF?(S1X+KTX)()?(S2X+KT X)THENOKX=1:KTX=225

470 NEXT: IFOKX=1THENSOUND 0,-15,4,20: =FALSE

480 VDU28,0,31,39,23,12:P RINTTAB(15,0); "Well done!": PRINTTAB(14,6); "Press retur n";:REPEAT:READN%,D%:SOUND1



,-15,N%,D%:SOUND1,0,0,1:UNT ILN%=0:REPEAT:UNTILGET=13

498 =TRUE

500 DEF PROCLookup:LOCALC %,R%,A%,B%,ad%,NA%,ND%,vp1%, vp2%:6COL3,1:vp1%=0:vp2%=0 510 *FX21

520 FORCX=1T03:0SCLI"FX13 8.0,95":0SCLI"FX138,0,125": NEXT:FORRX=1T03:0SCLI"FX138 ,0,96":0SCLI"FX138,0,123":N

530 CLS:RX=1:CX=1:adX=0:V DU28,0,31,18,23:BX=137:NDX= 0:NAX=0:GOSUB690

548 REPEAT: REPEAT: PROCcur sor (C1%+(C%-1) *48,R1%+(DOWN %-R%) *44): A%=GET: PROCcursor (C1%+(C%-1) *48,R1%+(DOWN%-R %) *44)

550 IFAX>96ANDAX<123THENA 1=A1-32

560 IFAX>64ANDAX(91THENPR OCchalkin

578 IFAX=139ANDRX>1THENRX =RX-1 588 IFAX=136ANDCX>1THENCX

=C%-1 598 IFA%=137ANDC%(ACROSS%)

THENCX=CX+1 600 IFAX=138ANDRX<DOWNXTH ENRX=RX+1

610 IFAX=1ANDBX=138THENGO SUB700:BX=137:GOSUB690

620 IFAX=4ANDBX=137THENGD SUB690: BX=130: 60SUB700

630 IFAX=96THENPROCUP1

648 IFAX=123THENPROCUD2

650 IFAX=95THENPROCdown1

660 IFAX=125THENPROCdown2

678 UNTILAX=6:UNTILFNfin: IFBX=137THENGOSUB698 ELSEGO SUB700

680 ENDPROC

698 MOVE572,R1%-48:DRAW78 8,R1%-48:DRAW664,R1%-68:RET

700 MOVEC1%-78,756: DRAWC1 %-78,620: DRAWC1%-90,664: RET URN

710 DEF PROCinfin:LOCALA, X\$,A\$,KTI

720 REPEAT: CLS: PRINTTAB(1
1,3); "I am ready to load": PRINTTAB(13); "the crossword"
; PRINTTAB(14); "information"
730 PRINTTAB(12,9); "Which crossword": PRINTTAB(13) "do
you require": INPUTTAB(16,1

4); ">"; X\$: UNTILLEN(X\$) >8AND LEN(X\$) <=10

740 A=OPENIN X\$: INPUT# A.
ACROSSX, DOWNX, CAX, CDX: INPUT
A.A\$: \$(S2X) = A\$

750 LLX=CAX+CDX:DIMLL\$(LL X):KTX=0

760 REPEAT: INPUT# A, A\$: IF VAL (MID\$(A\$,5,3))<>LEN(A\$) -7THEN*FX125

778 KT%=KT%+1:IFKT%<=LL%T HENLL\$(KT%)=A\$

788 UNTIL EOF# A: CLOSE# A

798 IFKTX<>LLXTHEN*FX125 808 FORKTX=0TOACROSSX*DOW NX-1:IF?(S2X+KTX)=159THEN?(S1X+KTX)=159ELSE?(S1X+KTX)=

818 NEXT: ENDPROC

828 OSCLI"FX4": IFERR=170R ERR=222THENCLS: PRINTTAB(7,1 2); "Load error=re-run progr am": END

938 OSCLI*FX4*: IF ERR=17T HENPROCtypein: MODE6: PRINTTA B(0,12); "Goodbye": END

840 REPORT: PRINT* at line ":ERL

850 END

860 DEF PROCtypein

878 LOCALRI, CI, CTI, RTI, CH I: VDU5

880 FORRX=1TODOWNX:CHX=S2 X+(RX-1) +ACROSSX:RTX=R1X+(D OWNX-RX) +44+36:FORCX=0TOACR OSSX-1

898 CTX=C1X+CX+48+5:GCOL2
,0:MOVECTX,RTX:VDU255:GCOL0
,1:MOVECTX,RTX:SOUND1,-15,2
88,1:PRINTCHR\$(?(CHX+CX))

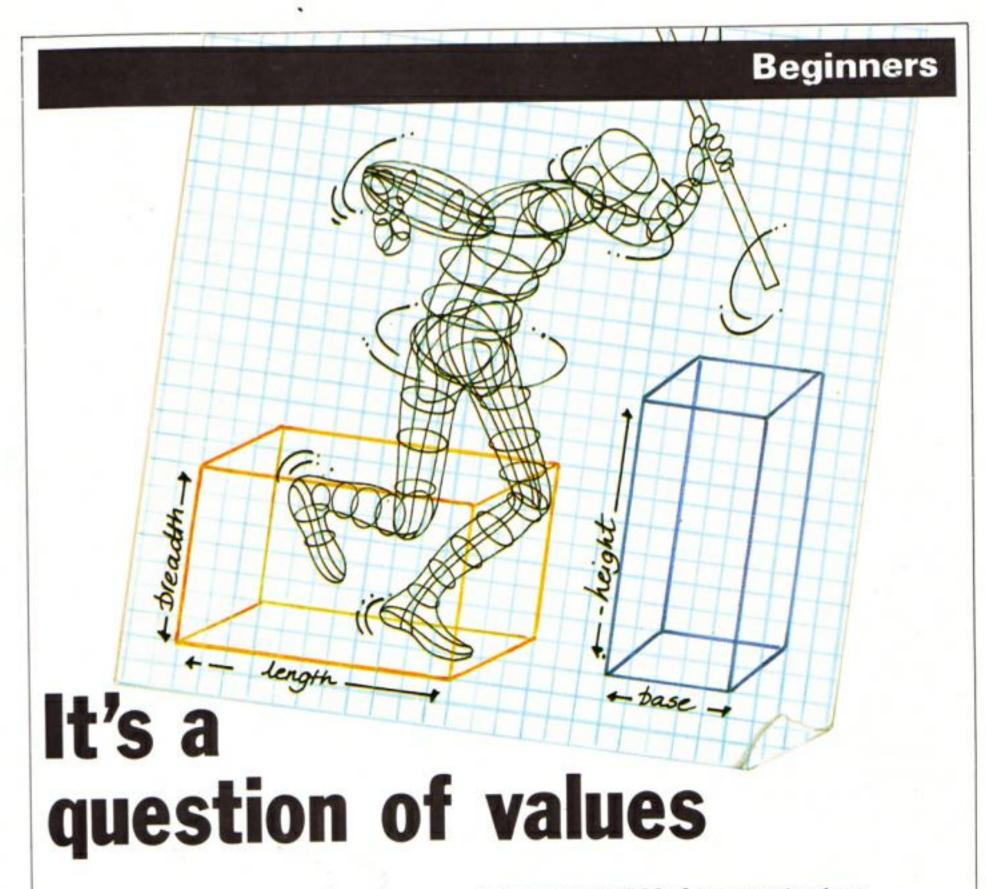
988 FORCTX=1T058: NEXT: NEX T: NEXT: VDU4

910 VDU28,0,31,39,23,12:P RINTTAB(16); "Answers":PRINT "'TAB(14); "Press return";: REPEAT:UNTILGET=13

928 ENDPROC

938 DATA148,8,148,12,164, 3,156,3,148,3,164,8,164,12, 176,3,168,3,164,3,168,8,168, ,12,184,3,176,3,168,3,164,8, ,152,8,148,15,8,8

This listing is included in this month's cassette tape offer. See order form on Page 50.



Variables come to the fore as PETE BIBBY demonstrates the value of passing parameters to procedures

IF you can cast your mind back, you'll recall that last month we took a look at procedures, sections of code very reminiscent of the subroutines we'd been dealing with previously.

However, unlike subroutines, they weren't called with a GOSUB and terminated with a RETURN.

What happens is that each procedure has a name, carefully laid down in the DEF PROC that defines that procedure.

Using the name in a program causes the Electron to go to the procedure definition and obey the lines it finds there.

When it runs up against the

ENDPROC that finishes the procedure, control is passed to the next statement, the one that comes after the procedure name that invoked the procedure in the first place.

In a way, you can look on a procedure name as a sort of keyword. When you use it the Electron performs a predetermined sequence of actions.

The difference is that in Basic the micro's designers have decided what happens. With a procedure you do.

Program I uses a procedure to calculate the area of a rectangle with sides length and breadth.

It's hardly a practical program, but it does show a procedure in action. Notice that every time you run the program you can give different values to length and breadth. Each time the same procedure, PROCarea, is called and does the calculation.

In a long program you can see that PROCarea might be called from several different places, each time with different values for the rectangle's dimensions.

In each case the action taken is the same: PROCarea takes the current values of length and breadth and works out area. Program II shows

18 REM Program I

20 PRINT "Length";

38 INPUT length

48 PRINT "Breadth";

58 IMPUT breadth

68 PROCarea

78 END

88 DEF PROCarea

98 area=length=breadth

100 PRINT "The area of a rectangle of length "; leng th 'and breadth ; breadth

' is 'jarea ' square units

118 ENDPROC

Program I

From Page 39

this to good effect.

The FOR...NEXT loop, with the aptly named loop control variable loop, cycles four times. At every pass of the loop line 30 ensures that values are read from the data

18 REM Program II 28 FOR loop=1 TO 4 38 READ length, breadth 48 PROCarea 50 PRINT 68 NEXT loop 78 DATA 18,8,12,7,3,2,19 .5,11 88 END 98 DEF PROCarea 100 area=length+breadth 110 PRINT "The area of a rectangle of length "; leng th "and breadth "; breadth " is "jarea " square units 120 ENDPROC

Program II

of line 70 into the variables length and breadth.

The next line calls PROCarea, which gives the area of the rectangle with these dimensions.

The result of this is that PROCarea is called four times. Notice that while the values of length and breadth are different on each occasion, PROCarea is exactly the same.

It does exactly the same job each time except for the fact that the rectangle's dimensions have changed.

This is an important point. The procedure itself doesn't vary. It takes whatever value is currently held in length, multiplies it by breadth and puts the result in area. The values of length and breadth may change but this is done in the main body of the program.

The procedure takes these values and works with them, giving the result. In a way, the procedure contains the general rule for arriving at a result, while the main program sets up the values to be used and calls the procedure to deal with them.

This, point will come up again during our dealings with procedures. One of the nice things about procedures is that when you've got one written you can use it in other programs.

So if you were working on a program that, say, figured out the amount of carpeting needed in a room you might need to know the area of a rectangle.

Rather than start again from scratch, you can just go to an already existing procedure and use that.

As with our subroutines, you can "plug" procedures into programs as needed. However, it does require a bit of thought, as Program III shows.

18 REM Program III
28 PRINT "Length";
38 INPUT base
48 PRINT "Breadth";
58 INPUT height
68 PROCarea
78 END
88 DEF PROCarea
98 area=length*breadth
188 PRINT "The area of a
rectangle of length "; leng
th '"and breadth "; breadth
" is "; area " square units
"
118 ENDPROC

Program III

Here our programmer has written the main section of the program and used a call to PROCarea to figure out the dimensions of the rectangle.

However, he's just tagged PROCarea on to the end of his code and sadly, it's not quite as easy as that.

Can you see what's going to go wrong? If not, run Program III and see for yourself.

The result is that you get rewarded with a:

No such variable at line 98

and quite right too. The main program uses the variables base and height to hold the dimensions of the rectangle.

The trouble is that our PROCarea uses length and breadth and expects to find values in these variables. As it is, this doesn't happen because the main program hasn't given them values.

And while we realise that

base is the same as length and height is interchangeable with breadth the Electron doesn't.

Hence the program halts with an error message. It can't find values for *length* and *breadth*.

This kind of problem can arise quite frequently when using procedures. The procedure has to use values taken from the main body of the program.

These values are known as the parameters of the procedure and if the procedure isn't given these parameters then it can't do it's job.

So far we've given our procedures the values they need by setting up the variables in the main program and using these same variables in the procedure.

There is another way of passing parameters to a procedure, as this is known, as Program IV shows.

18 REM Program IV
28 PRINT "Length";
38 INPUT length
48 PRINT "Breadth";
58 INPUT breadth
68 PROCarea(length,bread
th)
78 END
88 DEF PROCarea(length,b
readth)
98 area=length+breadth
188 PRINT "The area of a
rectangle of length "; leng
th '"and breadth "; breadth

118 ENDPROC

Program IV

At first sight this might seem the same as Program I and, in fact, it does exactly the same job. But take a closer look at lines 60 and 80.

' is 'jarea ' square units

You'll see that the procedure name is now followed by a set of brackets with variable names inside. In fact they're our old friends length and breadth.

This method of putting the variables, or parameters, that the procedure is going to use in brackets after the procedure name is our second way of passing parameters to a procedure.

When you run the program,

you're prompted as before for values for *length* and *breadth*. So far, so good. Now, however, instead of:

68 PROCarea

the procedure is called with:

60 PROCarea (length, breadth)

Whereas before the procedure had to "search" for the values it needed as it came across the variables used in its definition, now the procedure call itself specifically tells it which variables to use.

In other words:

68 PROCarea(length,breadth)

tells the Electron "Perform PROCarea and use the values you'll find held in the variables length and breadth".

Run the program a few times and check that it works. Unless you've switched off or hit Break or generally messed around, you'll find that the procedure PROCarea is still available to be used in command or immediate mode.

So you can enter:

length=7 breadth=5 PROCarea(length,breadth)

and be rewarded with the area of that rectangle.

And you don't have to use variables in the procedure call, you could use the values themselves as you'll find if you try:

PROCarea (7,5)

or:

PROCarea (15,4)

You can even use other variables than length and breadth, so long as you've given them values. If you don't believe me, enter:

tom=4 dick=3 PROCarea(tom,dick)

or

first=6 second=2 PROCarea(first,second)

and see for yourself.

Now this seems a bit contradictory, doesn't it? After all we've defined our

Beginners

procedure with:

80 DEF PROCarea(length,bre adth)

and now we're whistling it up with:

PROCarea (first, second)

The variables in our procedure call, first and second, don't match those in the procedure definition - to whit, length and breadth.

However, when we're passing parameters this is allowed.
What happens is that when
the Electron comes across a
procedure call it looks at the
variables used in that call,
takes their values and passes
them to the corresponding
variables in the procedure
definition.

In the above case, first has been given the value 6 while second has the value 2. When the micro comes across:

PROCarea (first, second)

it looks at the values of the variables in the parameter list (in brackets after the procedure name) and substitutes for them.

The result is that:

PROCarea (first, second)

becomes:

PROCarea (6,2)

The micro then looks at the definition of PROCarea and sees that it has two parameters, length and breadth. It accordingly gives length the value of 6, breadth the value of 2 and the procedure does its job with these two figures.

A point to notice is that there's a one-to-one correspondence between the parameters in the procedure call and the procedure definition.

There has to be the same number of them, they have to be the same type and the order matters, as we'll see next time.

Meanwhile we can use our newfound knowledge of passing parameters to "cure" Program III by rewriting it as

18 REM Program V

28 PRINT "Length";

38 INPUT base

48 PRINT "Breadth";

50 IMPUT height

68 PROCarea(base, height)

78 END

88 DEF PROCarea(length,b

readth)

98 area=length+breadth

108 PRINT "The area of a rectangle of length "; leng th "and breadth "; breadth

' is 'jarea ' square units

118 ENDPROC

Program V

Program V.

Here the dimensions of our rectangle are again stored in base and height while the procedure definition uses length and breadth.

Now, however, there's no problem as the parameters are passed to the procedure via a parameter list in brackets.

Given this extra information, the Electron is clever enough to do the translation, substituting the value of base for length and height for breadth.

And that's where we'll leave it for this month. Have a go at rewriting some of last month's procedures using brackets after the procedure name to allow the passing of parameters.

 That should keep you busy until next time when we take a further look at parameters and meet local and global variables.

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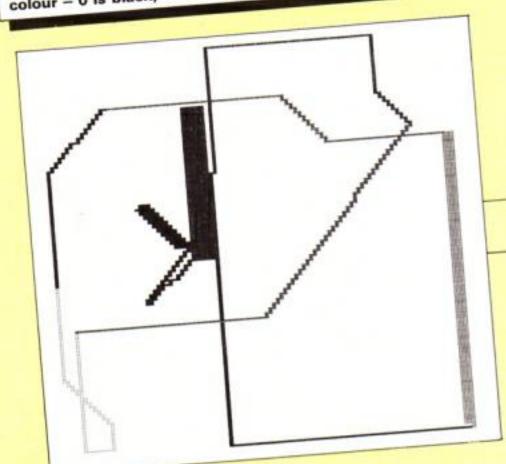
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Doodle Art

THIS is a simple drawing utility for doodling on the screen. Use the cursor keys to move and press 0 to 7 to select a colour - 0 is black, 1 is red, 2 is green and so on.





1 MODE 2: *FX4,1 2 VDU23,1,8;8;8;8;8; 3 XX=648: YX=512 4 REPEAT KX=INKEY® 5 IF K%>47 AND K%<56 BC DL 0, K%-48 6 MOVE XX, YX 7 XX=XX+8*((KX=136)-(KX 8 YX=YX+8*((KX=138)-(KX =139)) 9 DRAW XX, YX 10 UNTIL 8

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By PHIL ORD and KEITH OWENS

The keys are:

Z left right х

up

down jump

Return

MAIN VARIABLES

X%, Y% Coordinates of rat catcher. X,Y Rat coordinates.

sc% Score. 1%

for each rat caught and when all are eliminated in

one level you move on to

given in the program.

Full instructions are

Remember - the bonus

starts decreasing as soon

as you press the spacebar

to start each level, so be

the next.

prepared.

Loop number to determine how often to print a sk%

Skill level. rl%

Number of rats still to be caught. bon% Bonus.

PROCEDURES

Defines characters.

chars

set up

jump

right

down

kill rats

best score

rats

left

up

init

Sets initial variables and sound envelopes. Designs and displays screen layout.

key

Checks for key press, acts accordingly. Relocates rat catcher in opposite room.

Moves left, tests for collision.

Moves right, tests for collision Moves up, tests for collision.

Moves down, tests for collision.

Places rats at random. Number of rats depends on skill level.

Updates score, and produces a sound to indicate rat caught. next level

Adds remaining bonus to score advances skill level. end

Displays final score.

Displays best score so far, offers new

inst Prints instructions

> Full listing starts on Page 44

From Page 43

10 REM Rat Catcher

28 REM By P. Ord+K. Owens

30 REM (c) Electron User

40 *KEY10 ZX=0:MCLS:MOLD

IM IN LISTIN

50 ON ERROR ZX=0:MODE6:R EPORT:PRINT" at line ";ERL: END

68 MODE1: VDU7: PRINTTAB(8
,12) "INSTRUCTIONS Y or N?":
W\$=6ET\$: IFW\$< > "Y"ANDW\$< > "N"
GOTO68

70 IFWs="Y" PROCinst

88 INPUTTAB(8,16) "SOUND

Y or N?"S\$: IFS\$="Y"80T0100

98 +FX218,1

100 MODE5: PROCchars

118 sc%=8:bon%=3888:sk%=1

128 PROCinit: PROCset_up: G DT0358

130 DEFPROCCHArs

140 VDU23,224,32,112,32,1
12,248,112,80,80,23,225,0,2
55,255,255,255,255,255,255,255,
23,226,248,248,248,248,248,248,
248,248,248,23,227,0,32,96,
248,56,8,120,0,23,1,0;0;0;0

150 ENDPROC

160 DEFPROCInit

170 XX=560:YX=288:rX=0:r1 X=0

180 IFskX=1 tX=3000ELSEIF skX=2 OR skX=3 tX=2500ELSEI FskX=4 tX=2200ELSEIFskX=5 t X=2000ELSEIFskX>5 tX=2000

198 A\$=STRING\$(16,CHR\$(22 5)):B\$=CHR\$(226)+CHR\$(8)+CH R\$(18):C\$=STRING\$(23,B\$)

200 ENVELOPE1,1,-3,5,-8,7 ,19,8,126,0,0,-126,126,126: ENVELOPE2,1,-7,2,-2,28,18,5 ,126,0,0,-126,126,126:ENVEL OPE3,1,-20,8,-16,2,23,38,12 6,0,0,-126,126,126

218 ENDPROC

220 DEFPROCset up

238 VDU5,24,120;224;1120; 960;:6COL0,128:CL6:VDU19,3, 2;0::6COL0,3:MOVE110,896:PR INT;A\$:MOVE110,544:PRINT;A\$:X=320:Y=772:6COL0,131:FORI =1T04

248 VDU24, X; Y; X+112; Y+92; :CL6: VDU24, X-168; Y+32; X-48; Y+68; :CL6: VDU24, X-88; Y-64; X -48; Y+28; :CL6: VDU24, X-88; Y-



96; X+192; Y-68; : CLG

250 VDU24, X+160; Y-64; X+19 2; Y+28; :CL6: VDU24, X+160; Y+3 2; X+272; Y+60; :CL6: X=X+480: I FX>800 X=320: Y=420

260 NEXT: VDU26: MOVE120,96 8: PRINT; A\$: MOVE120,608: PRIN T; A\$: MOVE120,256: PRINT; A\$: M OVE120,960: PRINT; C\$: MOVE108 0,960: PRINT; C\$

278 GCOL8,8:MOVE88,968:PR INT;C\$:MOVE1128,968:PRINT;C \$:MOVE688,928:VDU226:MOVE68 8,576:VDU226

280 RESTORE290:FORI=1T04: READX,Y:MOVEX,Y:VDU226:NEXT 290 DATA160,896,1040,896, 160,544,1040,544

300 rat%=TRUE:FORI=1TOsk% *5:PROCrats:NEXT:rat%=FALSE :6COL3,2:MOVEX%,Y%:VDU224

310 VDU4:COLOUR2:PRINTTAB (5,1) "BONUS=";t%*sk%

328 *FX21.8

330 PRINTTAB(6,26) "LEVEL "; sk%; TAB(2,28) "PRESS SPACE -BAR": REPEATUNTILGET=32: PRI NTTAB(2,28); SPC(15); TAB(4,2 8) "SCORE="; sc%: VDU5

340 TIME=0

350 PROCkey: IFr1%=0 60T01 20 ELSE PROCrats: GOT0350

360 DEF PROCKEY

378 bon%=sk%+t%-((TIME DI V 20)+20):IFbon%(0 bon%=0:P ROCend

380 VDU4: PRINTTAB(11,1); b

on%;" ": VDU5

398 +FX21.8

400 IF INKEY(-74)ANDYX(60 8 PROCjump(120,576):FORD=1T 0200:NEXT

410 IF INKEY(-74)ANDYX)60 8 PROCjump(120,224):FORD=1T 0200:NEXT

428 IF INKEY(-98) PROCLET

430 IF INKEY(-67) PROCrig

440 IF INKEY(-73) PROCup 450 IF INKEY(-105) PROCdo

460 ENDPROC

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478 DEFPROCjump(xX,yX)
488 GCOLØ,8:MOVEXX,YX:VDU
224:GCOL3,2:REPEAT:XX=xX+RN
D(23)+48:YX=yX+RND(18)+32:U
NTI:POINT(YX+28,YX=14)-8:WO

NTILPOINT (XX+28, YX-16) =0: MO VEXX, YX: VDU224: ENDPROC

490 DEF PROCLeft

500 IFPOINT(XX-4, YX-14)=1 PROCkill_rat(XX-40, YX)

510 IFPOINT(XX-36, YX-16) = 4 OR POINT(XX-36, YX-16) = 3 E NDPROC

528 XX=XX-40:6COL3,2:MOVE

XX,YX: VDU224: MOVEXX+40,YX: V DU224

538 ENDPROC

540 DEF PROCright

558 IFPOINT(XX+68, YX-16) = 1 PROCkill_rat(XX+48, YX)

568 IFPOINT(XX+68,YX-16)= 40RPOINT(XX+68,YX-16)=3 END PROC

570 XX=XX+40:GCOL3,2:MOVE XX,YX:VDU224:MOVEXX-40,YX:V DU224:ENDPROC

580 DEF PROCUP

598 IFPOINT(XX+28,YX+28)= 1 PROCkill_rat(XX,YX+32)

600 IFPOINT(XX, YX+16) = 40R POINT(XX, YX+16) = 3 ENDPROC

618 YX=YX+32:6C0L3,2:MOVE XX,YX:VDU224:MOVEXX,YX-32:V DU224:ENDPROC

628 DEF PROCdown

630 IFPOINT(XX+28, YX-44) =

1 PROCKIll_rat(XX,YX-32)

640 IFPOINT(XX,YX-48)=40R POINT(XX,YX-48)=3 ENDPROC

658 YX=YX-32:6COL3,2:MOVE XX,YX:VDU224:MOVEXX,YX+32:V

660 ENDPROC

678 DEFPROCrats

688 IFrat% S0T0728

100 IF 1844 0010726

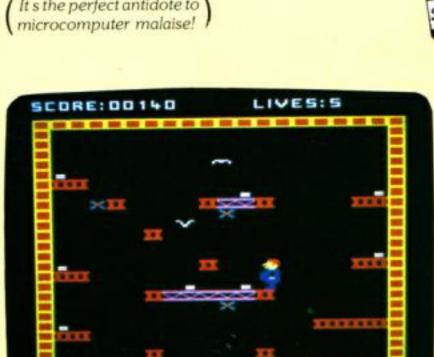
690 IFsk%(6 GOTO710

700 r%=r%+1:IFr%=30-(sk%+ 2) r%=0:60T0720 ELSE ENDPRO

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These two cassettes are not only crammed with 18 of the best games from the early days of Electron User. At no extra expense, we've included on each an unpublished Roland Waddilove machine code masterpiece as a freebie. Roland's Jam Butty and Atom Smash are arcade action at its fastest and most frustrating. And they're only available with Ten of the Best. So give yourself a treat ... with the most popular cassettes we've ever produced.

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Go egg collecting, but keep away from the proliferating rabbits Castles of Sand

Build castles - but beware the rising tide and hungry sandworms.

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Test your reactions with this traffic lights simulation.

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lump for your life in this exciting arcade action game.

Break free

Test your wits and reflexes in this popular classic ball game.

Code Breaker

Crack the code in a colourful if frustrating brainteaser.

Parachute

Save the plunging sky divers from a watery end.

Star Fighter

Attack the bandit ships in this fast-moving 3D punch-up

TO ORDER, PLEASE USE THE FORM ON PAGE 53

Rat Catcher listing

From Page 44

C

710 r%=r%+1: IFr%=120-(sk% *20) r%=0:GOTO720 ELSE ENDP ROC

728 X=128+RND(23)+48:Y=25 6+RND(21)+32

738 IFPOINT(X+4,Y-18)<>8 GOTO728

740 IFPOINT(X+20,Y-16)<>0 GOTO720

758 IFX=568ANDY=288 GOTO7

768 GCOL8,1:MOVEX,Y:VDU22 7:r1%=r1%+1:ENDPROC

770 DEFPROCKill_rat(a%,b%

780 sc%=sc%+10:VDU4:PRINT TAB(10,28);sc%:VDU5 790 SOUND1,1,100,5:GCOL0, 0:MOVEa%,b%:VDU227:r1%=r1%-1:IFr1%=0 PROCnext_level 800 ENDPROC 818 DEFPROCnext_level 828 SOUND1,2,188,48:FORD= 1T01288:NEXT

838 IFbon% VDU4: REPEAT: bon%=bon%-28:sc%=sc%+28:SOU ND&11,3,188,1:PRINTTAB(11,1);bon%;TAB(18,28);sc%:SOUND &11,8,188,2:UNTILbon%<=8 848 VDU5:sk%=sk%+1:ENDPRO

850 DEFPROCend

868 SOUND1,3,108,40:FORD= 1T02000:NEXT:VDU26,4,12,28, 0,23,19,7,17,129,12:GCOL0,2 :MOVE0,820:DRAW1279,820:MOV E0,236:DRAW1279,236

870 IFZX=0 bscX=scX:ZX=1 880 PRINTTAB(5,1) "GAME O VER*TAB(3,3) "YOUR SCORE WAS "TAB(8,5);scX:PROCbest_scor e:ENDPROC

890 DEFPROCHEST_score 900 IFsc%>bsc% bsc%=sc% 910 PRINTTAB(1,8) "BEST SC ORE SO FAR*TAB(8,10);bsc% 920 *FX21.0

930 PRINTTAB(3,13) "PRESS SPACEBAR" TAB(4,15) "FOR NEW GAME": REPEATUNTILGET=32: COL DUR128: VDU26,12,5

948 GOTO118

958 DEFPROCINST

960 VDU19,3,6;0;12,23,1,8 ;0;0;0;:COLOUR2:PRINTTAB(15 ,0) "RATCATCHER":COLOUR3

978 PRINTTAB(1,2) "Use the control keys to guide the rat-"TAB(1,4) "catcher around the screen picking off "TAB(1,6) "rats as fast as they appear. You can use"

980 PRINTTAB(1,8)"the 're turn' key to skip from one room"TAB(1,10)"to the othe r.You must eliminate all th e"TAB(1,12)"rats on each le vel before the bonus has" 990 PRINTTAB(1,14)"reache d zero or the game will end
. High "TAB(1,16) "scores will
l only be achieved by swi
ft "TAB(1,18) "reactions and
decisive rat elimination."
1000 COLOUR2: PRINTTAB(14,2
0) "CONTROL KEYS "TAB(4,22) "Z
--- "TAB(21,22) "X --- "TAB(4,24) ": --- "TAB(21,24) "/ --"TAB(10,26) "return --- "
1010 COLOUR3: PRINTTAB(10,2

2) "MOVE LEFT" TAB(27,22) "MOVE E RIGHT TAB(10,24) "MOVE UP" TAB(27,24) "MOVE DOWN" TAB(21,26) "RE-LOCATE"

1020 COLOUR2:PRINTTAB(5,29) "Press the spacebar to con tinue":REPEATUNTILGET=32:VD U20:CLS:ENDPROC

This listing is included in this month's cassette tape offer. See order form on Page 50.

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Micro Messages

MANY thanks for the useful printer driver published in the August issue. It's nice to see some serious software in print for the Electron.

However I find it desirable to be able to use both superscript and subscript in many documents, and as published, the driver cannot cope with the escape sequence needed to produce these.

I have therefore produced the following modifications which enable both to be implemented.

I have chosen to sacrifice double strike because it's a waste of time, and NLQ because you can't use super/subscript with it on the Epson.

The alterations are as follows:

451 LDA table, X:CMP #&54: BNE cont1 452 LDA #27:JSR send:LDA

#&54:JMP cont

460 .contl INX 471 CMP #&54:BEQ finish

488 .cont JSR send

800 EQUD &54FF0053 \HT 13 1=superscript

818 EQUD &54FF8153 \HT 13 2=subscript

This adds only 21 bytes to the code and enables you to print:

H2SO4 E=MC2

without affecting the operation of the other printer codes like italic, enlarged and so on.

I realise it is rather a brute force approach and that it isn't a particularly elegant piece of code — the codes to turn on super/subscript are sent again when turning them off.

However it does enable one of the more useful features of the Epson to be used. – G. W. Lynes, Buckhurst Hill, Essex.

Letters on View

I OWN a copy of Acornsoft's View and am having trouble when it comes to printing out letters. It will only print

Escape sequence for superscript

halfway across the page.

I have an LX80 Epson printer and I am getting very frustrated. Please help. - Steven Talbott, Swavesey, Cambs.

 You must set the ruler to 80 columns to printer the full width of the paper.

The easiest way is to work in Mode 3 or Mode 0. Don't forget to type NEW before you start, otherwise you may still have the Mode 6 ruler set at 40 columns.

Aerial selection

I AM in doubt whether to choose either Phantom Combat or Strike Force Harrier. Could you review both, and suggest which one you think to be the best? – Peter Gunn, Wick, Caithness.

 Phantom Combat was reviewed in the April 1986 issue of Electron User and Strike Force Harrier was in the January 1986 issue.

Both are excellent games and were recommended by the reviewers, so the choice is entirely up to you – sorry.

Try to see both games before you buy. Either way you'll get value for money.

Increased memory

I WOULD like to know if it is possible to increase the memory of my Electron. Does sideways ram do this?

I need about 40k for the program I have in mind. - J.W. Hogarth, Southend.

 Both Slogger and PMS have ram upgrades for the Electron in the form of second processors. These provide you with a vast increase in memory available.

Remember, though, that nearly all software is designed to run on an unexpanded Electron without this ram and will not take advantage of it.

Roms such as View and Starword do take advantage of the extra memory, enabling you to write much longer letters and documents.

Of course your own programs can be much longer and you'll rarely run out of memory. We'll be reviewing the Slogger upgrade in a future issue.

Sideways ram is totally different to these products and will not give you more memory. For a full explanation have a look at the sideways ram article in the February 1986 issue of Electron User.

Games proficiency

AS a recent purchaser of an Electron I am horrified at the poor quality of software which I have come across. With the machine came, inter alia, a program called Boxer from Acornsoft.

This is a disaster, as the player has next to no chance of success in achieving the object of the game.

My latest purchase, which I have just received, is Volume 1 of your own Ten of the Best which contains, "as a freebie", Roland Waddilove's Jam Butty which also is a disaster as there is no way that the player can get off the ground floor.

It seems to me that the instructions are so poor that it is no wonder the program was previously unpublished.

I have not yet had time to peruse the remaining programs on this cassette but I hope that they will be of much higher standard than the two I mention.

Incidentally, why have the whizz kids not yet found a way of recovering a program using OLD instead of leaving the poor user to guddle round with rewinding and reloading?

I remain, as yet, a disgruntled and annoyed Electron User. – Simon A. Smith, North Berwick, East Lothian.

It takes a lot of patience and practice to become proficient at a game. You would be very disappointed if you paid five or ten pounds for a game and found it so easy that you completed it the same day.

There are usually puzzles to solve and techniques to master and the game may take several weeks to complete.

On the first screen in Jam Butty run right until you hit the girder. Take seven steps left and hit the right and jump keys simultaneously. You should now find that you are off the ground and standing on the first level.

We'll leave it to you to work out how to get on to the next girder.

It is impossible to recover commercial software after pressing Break.

A way with vultures

MY mother and I decided to type in the program Necromancer from the listing in the February 1986 Electron User and it was a success.

We had few bugs and they were corrected in no time at all. The whole family enjoys it and my highest score is eight out of ten.

However one thing bothers me. Although I have the torch



From Page 47

and I know the vulture doesn't like light I can't scare it away. This is getting quite frustrating.

If anyone knows how to scare the vulture away please, please will you let me know. – John Lewis, Grantham, Lincs.

Try throwing the torch at it!

Handicapped Snapdragon

THE Snapdragon in the July issue of Electron User is blind! In order to obviate this patently unfair disadvantage line 1280 should read as follows:

1288 VDU23,224,1,3,43,95,4
7,15,9,13,23,225,17,189,255,255,255,255,8,128,23,226,2
8,184,248,248,248,248,144,2
16,23,227,88,128,118,128,12
6,24,12,12

Long may your informative and entertaining magazine continue. – Derek Meacham, Ebbw Vale, Gwent.

 Many thanks for the correction Derek, we hadn't noticed the missing eyes.

Line 1330 wasn't very clear in some copies and should read:

:330 IF N\$=N1\$ MOVE232,318 :VDU18,0,0,224,225,226,8,11 ,227:SDUND0,5,2,50:FOR I=1 TO 30:GCOL0,RND(3):MOVE325, 334:DRAWX2%+32,(Y2%+10)-RND (421:NEXT:ENDPROC

Double height text

I HAVE had an Electron for about a year now and I've hit a problem.

On the BBC Micro it is possible to print normal type in double height by using CHR\$(141).

This is not possible on the Electron. Could you please tell me how to do it? - David Laver, Dewsbury, West Yorkshire.

 The following short program demonstrates how to print double height text.

To use double height in your own programs include the

WHAT would you like to see in future issues of Electron User?

What tips have you picked up that could help other readers?

Here is your opportunity to share your experiences.

Remember that these are the pages that you

write yourselves. So tear yourself away from your Electron keyboard and drop us a line.

The address is:

Micro Messages Electron User Europa House 68 Chester Road Hazel Grove Stockport SK7 5NY.

procedures PROCbig and PROCa.

:0 MODE 1

28 COLOUR 2

30 PRINT TAB(10.15);

48 PROChia ("Electron")

50 END

68
78 DEFPROCULC (A\$): FORIX=
1TOLEN A\$: 7%98=ASC (MID\$ (A\$,
IX,11): AX=18: XX=&98: YX=8: CA
LL&FFF1: FORJX=8TO1: VDU23, 22
5: FORKX=2TO9: VDU7 (&98+4*J2+
KXDIV2): NEXT: VDU225, 18.8: NE
XT: VDU11, 11.9: NEXT: ENDPROC

90 DEFPROCa(AX,BX,A\$):PR INTTAB(AX,BX):A\$:VDU5:MOVEA X+64-8,1016-BX+J2:PRINTA\$:V DU4:ENDPROC

Left in the dark

PLEASE could you tell me if there is a light pen available for the Electron. — W. Hall, Billericay, Essex.

●We haven't see any light pens for the Electron. It may not be possible to produce one as it lacks the special chip the BBC Micro uses for its lightpen.

Upgrade unnecessary

AS you have said many times before in Micro Messages, no one has made a device to upgrade the Electron's 1.00 operating system to 1.20.

I have noticed that a 1.20 operating system is on sale from Watford Electronics for

Would it therefore be possible to unsolder the original 1.00 operating system, and fit a new 1.20 operating system?

I have a friend who owns a BBC B which originally had a 0.1 operating system, and has now upgraded it to 1.20 (his BBC Micro was one of the first to come out).

If this is possible would I then be able to run non-mode 7 BBC software, but still be able to run Electron software?

 R. Adams, Surbiton, Surrey.

 The Electron's 1.0 operating system is equivalent to the BBC Micro's 1.2 operating system so there is no need to upgrade.

The BBC Micro's OS would not work in the Electron.

Process controls

I HAVE recently bought an Electron along with a Plus 1 and 3 units and have taken out a year's subscription for your magazine, which I find excellent value for money.

My motive in doing so is to learn how computer technology can make things work, especially for applications in industry such as chemical process control.

Generally speaking there seems to be a lot of articles and technology about for the purposes of information storage and manipulation, but not of the kind for control of gadgets — motors, valves, sensors, and so on — in home or industry.

My efforts to learn of these techniques are being slowly helped by attending a local college, but some DIY applications along these lines in your magazine would be welcome and in general I feel well received. – J. R. Fraser, South Hylton, Sunderland.

A standard Electron isn't

really suitable for control applications and you'll need a Plus 1 at least.

Most hardware projects would require Advanced Computer Products' Plus 5 interface as well since this provides a Tube interface, user port and 1 MHz bus.

With an Electron, Plus 1 and Plus 5 you should be able to use some of the hardware add on's for the BBC Micro.

We'll be investigating this possibility as soon as we get our hands on a Plus 5.

Moving plea

I LIKE trying to program games on my Electron, but I cannot make a character move around the screen without pressing a key or using a joystick.

Please could you tell me how to do this. - Martyn Graham, Isleworth, Middlesex.

 This short program will move an asterisk smoothly across the screen. You could easily redefine the asterisk to be a space invader or pac-man.

The FOR. . . NEXT loop controls how far across the screen it travels and the 10 in line 40 determines how far down the screen it is.

10 MODE 4

20 FOR x=1 TO 39

48 PRINT TAB(x,18)" +"

50 FOR delay=1 TO 100

58 NEXT

78 NEXT

Order of the !BOOT

COULD you please solve a puzzle for me. Looking back at my Electron User I noticed in the August 1985 edition in Micro Messages a letter regarding the message:

Acorn Electron Searching File not found Basic

You told David Bociek that when Shift+Break are pressed the disc drive will look for the file IBOOT.

I have just bought the Cumana disc drive and have tried for ages to try to get the IBOOT to work, but have had no luck.

I do have an additional rom, but this has no effect on the IBOOT.

Also, looking inside my Cumana disc interface I find an R16 missing from the circuit board. Is this the problem? – Richard Bates, Beckenham, Kent.

None of these are the problem. After creating the IBOOT file you need to tell the Electron what to do with it, otherwise nothing will happen. You do this with the OPT command:

*0PT4.8

means ignore the !BOOT file and is the default state. Enter:

*OPT4.1

to tell the Electron to:

*LOAD ! BOOT

and:

#0PT4.2

to tell it to:

*RUN ! BOOT

The most common option is:

*0PT4.3

which means:

*EXEC ! BOOT

Rom problems

I SHOULD like to be able to use the Slogger T2P3 rom without the expense of buying a Plus 1.

Is there a rom socket within the Plus 3 or a position on the Electron circuit board which would allow the T2P3 rom to be paged?

Also can you tell me where I can get hold of a circuit diagram for the Electron? - K.

R. Towers, Great Eccleston, Lancs.

 There aren't any empty rom sockets in the Electron or Plus 3, so you'll have to buy a Rombox or Plus 1 and rom cartridge.

You'll find a circuit diagram in the Electron Advanced User Guide.

... and Rams

ON reading past issues of Electron User I notice that in Micro Messages you say that IC 18 was not plugged into the circuit board.

Therefore I wonder, if you have a Plus 3 fitted, can you

Loading error signal

IN Micro Messages of May 1986 you said it was not possible to make a beep when there is a tape loading error. This is not so!

The BBC Micro on making an error issues a VDU 7. The Electron OS does the same except that because the ULA is in cassette input mode it does not make a sound.

However for a period after the error is issued it is not necessary to be in cassette input mode as it will take a moment to rewind the tape.

The enclosed program forces a beep every time a VDU 7 is made, regardless of the state of the ULA. — M. Chilton, Oxford.

CLI	
LL1	258 STA &FE87
RTS	268 RTS
aain	278 .out JMP (&78)
CMP #7	288 .wait LDX #8
BNE out	298 .y LDY #8
7/2/01/12/2007	300 .i INY: BNE i
DRA #2	318 INX: BHE Y
STA &FE87	328 RTS
LDA #58	330]
STA &FE86	348 NEXT
JSR wait	350 CALL init
	ANT SACATOS ASS
	RTS .main CMP 07 BME out LDA &282 DRA 02 STA &FE07 LDA 050 STA &FE06

place into the socket an 8k static ram, so making PAGE &EOO?

If this is not possible, can you place ACPs 1770 DFS into the socket and so have both DFSs available? - David Jones, Greasby, Wirral.

 An EOO DFS is available from ACP, but you'll need their sideways ram cartridge to use it. You can't plug anything into the Electron's circuit board.

Flip for a better Hell

I HAVE just bought Stairway to Hell by Software Invasion which I saw advertised in the August 1986 edition of the Electron User.

While I find that this is a very good game I tried the BBC side of the tape on my uncle's BBC B and found that this is much superior.

I wonder if there is any program code which I could use to enable me to play the BBC version of the game on my Electron. – Tim Cluderay, Leeds

 The BBC Micro version will only run on a BBC Micro and cannot be made to run on an Electron.

The Electron version may be improved by upgrading your Electron to a Turbo, available from Slogger.

Better boards

AFIER reading Trevor Dunkerley's letter in the August 1986 issue of Electron User I am inclined to agree with him about the shows – too crowded.

Concerning his problem with Micronet, perhaps he should try some of the independent boards. Some of these are very good and include sections about the Electron.

The Potbug bulletin board is free to use and is backed by a well established computer group.

Once a user has registered

he or she will receive our fairly regular newsletter written by the sysop.

At least one subsection contains articles for the Electron although it is the newest on the board.

Users with Electrons or those interested in adventures and fantasy games should look at "Out to Lunch...The Movie..." on registered Menu 2 of the Potbug board.

This can be accessed on 0782 503254 from 8pm to 11pm during weekdays or 2pm to 11pm at weekends.

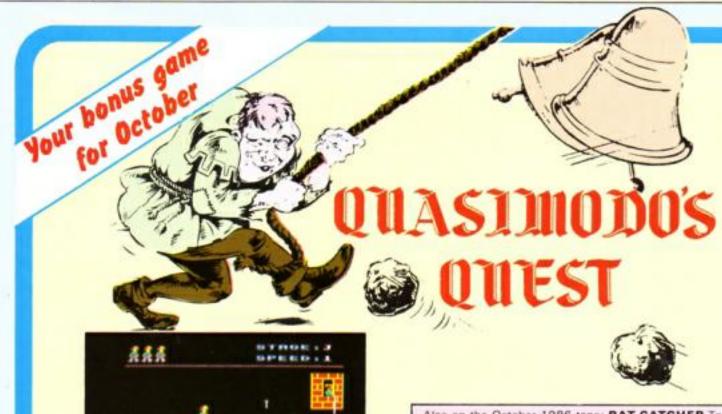
The board is updated every two weeks and boasts a selection of dedicated subeditors. – Jon Hancock, Stoke-on-Trent, Staffs.

ALL programs printed in this issue are exact reproduction of listings taken from running programs which have been thoroughly tested.

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program

they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.



Also on the October 1986 tape: RAT CATCHER Try your hand at pest control with this fast action arcade game. MATHS FUN Put your powers of mental arithmetic to the test with this educational program. BOS Take the tedium out of debugging listings and sort out your typing slips with this on-screen editor. CROSSWORD Two programs for crossword lovers one to design crosswords and one to help you solve them. 10 LINERS A short program from our fascinating series

NOW'S your chance to play a brilliant version of one of the classic arcade games - in this extra game that comes with the October disc and tape.

Can you help Quasimodo rescue Esmerelda from the terrible tower and escape in one piece?

Too long to be included in the magazine as a type-in listing, this superb program uses machine code routines and colourful graphics to bring you all the thrills from the original - including rocks, arrows, swinging ropes, bat-tlements and spear-lunging guards.

One of its many features is the facility to select from four levels of difficulty and to enter the game at any screen for practice purposes.

If you enjoy fast action and fun, this is one treat you can't afford to miss!



All the programs from the last 12 months of Electron User are available on tape.

On the September 1986 tape: CAVERN CAPERS Blast your way from the depths of the labyrinth to escape from the planet. DRAW WRITER A superb utility to translate your on screen graphics to the procedures to create them. COMPANY COUNT Work your way up the company pecking order in this educational maths test. TEN LINERS Another short but fascinating program. + BONUS game; ROCKFALL Go diamond mining in this intriguing multi-screen arcade romp.

On the August 1986 tape: HOWZAT! A vivid recreation of a day's test cricket for two players. 3D MAZE Quick reactions and a sense of direction are needed to escape from our twisty maze. TEXTED Let this versatile text editor turn your micro into an electronic typewriter. DRIVER A powerful printer driver for View.

ROYAL WEDDING Celebrate the royal event with our ingenious sliding block puzzle. SNAPDRAGON Two player version of the classic card game. ATTRIBUTES Colourful two player strategy game. FORMATTER Make your listings easier to read. DISCS Extended star commands. EXTRA

COMMANDS A WHILE ... WEND command for your micro. PLUS superb digitised picture of Andrew and Sarah.

On the June 1986 tape: FISHING Enjoy a quite day by the river, and maybe catch your tea as well! TACTICAL PURSUIT A two player strategy game played with pawns on a chess board. MINIBASE Create an electronic telephone directory. EXTRA COMMANDS Add more commands to Basic SCREEN DUMP Multi-tone screens dumps for Epson compatible printers

On the May 1986 tape: MISSILE JAMMER Defend the city of Pezina from a missile invasion. VECTOR LETTERS Use *LINE to create double height text. DEGREES Convert from Centigrade to Fahrenheit and vice-versa. CROCODILE TEARS Spell well or end up as a crocodile's

dinner. ZAP Blast the marauding aliens. EXTRA COMMANDS Adding new keywords

On the April 1986 tape: INVASION FORCE Exciting zap 'em space game. EASTER EGG HUNT Seasonal game using compass points. BACH TO BASICS Music tutor. NOTICE BOARD Text scrolling utility. SEARCH and RECOVER Two routines from the disc article. NOTEBOOK Recursion backwards.

On the March 1986 tape: GRAND PRIX Exciting race game. DICER A clever test of strategy. MARCHING ORDER Counting and ordering numbers. FIND AND REPLACE Useful editing program. SECTOR EDITOR Excellent disc utility. TIMEPIEC Superb graphics demonstration, OXO Game of cunning. TRICIRC A circle of triangles.

On the February 1986 tape: NECROMANCER Superb text adventure GREBIT Arcade action. FAST BACKUP Disc utility. MACHINE CODE How to write an arcade game. TAPEDISC More software transferring techniques. SIDEWAYS RAM Example program.

On the January 1986 tape: FRUIT WORM An arcade classic. HELICOPTER RESCUE Pilot an air sea rescue helicopter. MACHINE CODE Detect collisions between sprites. TAPEDISC Transfer your software to disc. MODE012 Multi-Mode

On the December 1985 tape: GET SET SANTA Christmas fun collecting presents. MISSILE ATTACK Save your cities! PROGRAM PROBE Using joysticks. SPACE COUNT Counting for youngsters.
CHRISTMAS CARD Cards and carols for all. DISC MENU Disc Menu creator.

On the November 1985 tape: KARATE WARRIOR Electrifying combat. ULA Mode 6 Mode 71 PAINT ROLLER Colourful arcade action. DEFUSE Beware the bombs. SPRITE PRINT Machine code graphics utility. TRAIN Far from stationery

On the October 1985 tape: DUNGEON QUEST An amazing all action arcade adventure. PILOT Computer assisted learning language. RAVING ROLLER Arcade action in the garden. TRAIN Animated action. KALEIDOSCOPE Colourful graphics action.

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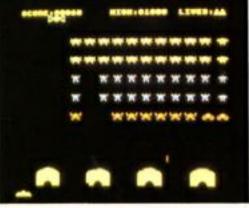


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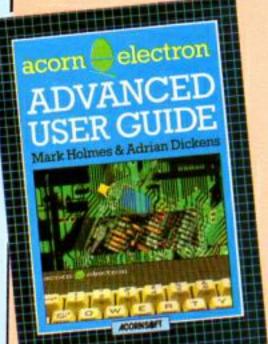
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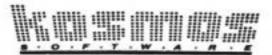


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'An excellent mixture of games' ... Personal Software - Autumn 1983.

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Although similar to Educational 1 this tape is more advanced and aimed at seven to twelve year olds. The tape includes MATH 1, MATH 2, AREA, MEMORY, CUBECOUNT and SPELL.

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"Very good indeed" ... A&B Computing - Jan/Feb 1984

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Sports simulations

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The June and July issues of COMPUTER GAMER magazine reviewed 16 soccer simulations, including Ocean's MATCHDAY and INTERNATIONAL MATCHDAY (128k SP), Addictive's FOOTBALL MANAGER, Artic's WORLD CUP and WORLD CUP 2, US Gold's WORLD CUP CARNIVAL, Virgin's FA CUP, etc etc. MEXICO '86 was given a NOVA overall rating and 5 "planets" from 5 for Value for Money. Only one other game could equal this, Commodore's classic INTERNATIONAL SOCCER.

ARE YOU STILL PLAYING THE SECOND RATERS?

TAPE 1 QUALIFIERS

TAPE 2 FINALS

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TAPE 1 (Qualifiers)

- ★ Current squad of 16 players + 20 user defined players.
- ANY team formation you choose. 2 from 5 substitutes.
- * Your qualification group: full results and table.
- In match tactics: any no. of individual player adjustments.

- TAPE 2 (Finals)
- ★ Choose a 20 man squad to take to the finals.
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- Extra Time, PENALTY SHOOT-OUTS, where relevant.
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L-SOFT comments: With 5 levels of play, 12 depths of sophistication, and "fun" graphics, this game can be enjoyed by an 8 year old youngster as a "fun" game, and by the most sophisticated as a tactical/strategy challenge of the highest order.

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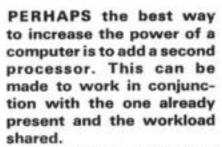
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It's like the old saying "Two heads are better than one" when it comes to sorting out a tricky problem.

When Acorn designed the Electron way back in 1982 they built in to it the ability to add a second processor.

In 1984 two second processors were released – a Z80 and 6502, named after the microprocessors they were based on.

Unfortunately these are expensive and can only be used with the BBC Micro since they use the Tube interface only present on that machine.

You could in fact plug one of these second processors into the Electron if you made up your own interface. However, they would still be too costly compared with the basic Electron.

Because of this PMS has brought out its own 6502 second processor E2P at less than half the price of Acorn's, and you won't need a Tube interface to use it either.

Let's go into more detail about what a second processor is and how it works.

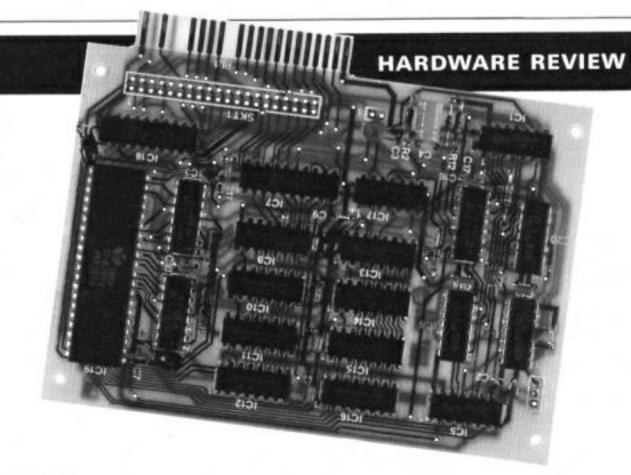
It can be thought of as a separate computer complete with 64k of ram connected to the Electron. There aren't any plugs, sockets or keyboard though, just an edge connector which plugs into the Electron.

Unlike the Electron, it does not have any of the usual methods of input or output, which means that it can't load, save, print on the screen or even read a keyboard.

With two processors the workload can be shared so these relatively time-consuming tasks are handled by the Electron which acts as an Input/Output or I/O processor while the second processor gets on with the business of actually running the program.

What happens when you load a program is that the Electron loads it and passes it over to be stored in the second processor, not the Electron itself.

When you subsequently run



High speed – and memory to match

Roland Waddilove looks over the PMS Second Processor

that program it is run in the second processor. However when you print something on the screen the characters are passed to the Electron and it is the Electron that prints them.

Of course while the Electron is busy printing, the second processor can get on with the task of running the program and it doesn't need to wait for the Electron to finish.

So you can see that while the Electron is carrying out one task the second processor is busy with the next and the whole program runs much faster.

Well, that's the theory anyway. What is a second processor like in practice?

The E2P, Electron 2nd Processor, is a fairly large but slim cartridge which plugs into either of the Plus 1 cartridge slots.

It contains its own 64k of ram plus a few odd chips here and there to handle input and output to the Electron through the edge connector.

The Tube operating system is required before the second processor can be used otherwise its presence simply won't be aknowledged.

The version I had for review was on disc and the second processor could be initialised with Shift+Break. After a slight pause the current language is copied across to the E2P since all you get is 64k of ram — no Basic, no operating system.

Normally this language will be Basic but it could be View, Viewsheet, Logo or whatever. This occupies &8000 to &BFFF in the memory map.

The operating system for the second processor is tiny since the Electron does all the hard work and only occupies &F800 to &FFFF, which means that 14k from &C000 is free for data or machine code.

The Electron handles all screen output and contains the screen memory. Consequently HIMEM — don't forget your program is in the second processor and not the Electron — is permanently fixed at &8000 whatever the mode.

It means an extra 20k of memory in Modes 0, 1 and 2, and about half this in Modes 3 to 6. Similarly the Electron handles all loading and saving, so the input and output buffers and disc workspace are contained in the Electron, not the second processor.

So even with a Plus 3, PAGE is firmly set at &800. No that's not a typing error, you get around 30k of memory free in any mode, even with discs!

Machine code programmers can use the spare 14k at &COOO as well.

For instance, using View in 80 column Mode 0 with a Plus 3 on a standard Electron there is enough memory for around 4.5k of text, whereas with the second processor you get a massive 30k.

PMS also supplies HiBasic, a version of BBC Basic which sits at &B800 giving around 44k of memory free for Basic or machine code regardless of mode.

This is ideal for large databases, adventures and programs which handle large amounts of data.

With two processors run-



HARDWARE REVIEW

From Page 55

ning in parallel there can be quite significant speed increases, so I carried out a few simple tests. Table I shows the results for a standard Electron. Electron plus E2P and BBC Micro.

Test 1 is a simple loop counting up to 30000 in Mode 6 and test 2 is the same test in Mode 1.

Notice that a normal Electron slows down in high resolution modes and that the second processor actually speeds up. It runs over three times as fast and is nearly the same as a BBC Micro.

Tests 3 and 4 are maths programs calculating SIN, COS and TAN in Mode 6 and Mode 1.

Again notice that the second processor version runs just as fast in either mode and almost as fast as the BBC.

Test 5 is a graphics program running in Mode 2. This is quite interesting since

Test	Electron	E2P	BBC
1 (Mode 6)	8.13	5.72	5.29
2 (Mode 1)	18.96	5.62	5.29
3 (Mode 6)	15.68	10.72	9.91
4 (Mode 1)	37.82	10.53	9.91
5 (Mode 2)	18.91	15.78	4.36
6 (Mode 2)	119.10	28.58	30.22

Table I: Results of the speed tests

the Electron and second processor are both fairly slow, with the BBC Micro streets ahead. The reason is that the Electron handles all output to the screen whether you've got a second processor or not, so it makes little difference.

Test 6 really shows what the second processor is capable of. It's a short program with a lot of maths and graphics, so while the Electron is busy drawing on the screen the second processor is racing ahead and working on the calculations.

Here the second processor is faster than a BBC Micro and over four times faster than a standard Electron.

Speed tests do not tell the

whole story though and a second processor isn't quite as useful as it may at first appear.

The problem is that nearly all software is designed to run on a standard Electron and it simply won't work with a second processor, though it's a simple matter to unplug it.

The trouble is that all the best software uses illegal methods to achieve its aims.

For instance arcade games write directly to the screen memory for speed and colour. However the screen memory simply isn't contained in the second processor so you can see the problem, or should I say, you can't!

So for the vast majority of software the second processor is effectively redundant. Of course you can write your own software taking advantage of the great speed and memory but not everyone is an expert programmer.

What you get when you buy a second processor is a superb piece of equipment which is offset by an almost total lack of software to take advantage

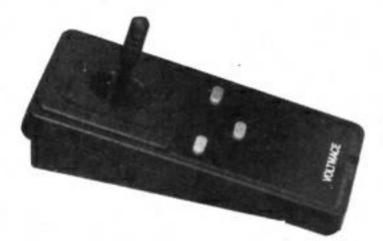
It's great for word processing, spreadsheets and databases, but apart from these you'll have to write your own programs.

Even some Electron User games won't work with the second processor.

It's the same old problem. A computer or peripheral is useless without software and software houses won't write software unless there is a large user base.

The solution is, as always in your hands. If enough Electron owners buy second processors the software houses will start producing software.

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with the I/O processor is required. The E2P Operating System, which controls the Second Processor, fully implements the Acorn TUBE protocols. Software written obeying these protocols will run in the E2P. The default language in the Electron is automatically copied into the E2P, on a CTR-BREAK and certain other languages (eg HIBASIC) can be directly *LOADed into the E2P. The Electron version of HIBASIC, which gives 44K free, can be obtained from PMS. The E2P will work in conjunction with the Slogger Turbo, and makes the Electron/E2P even faster!! The E2P is compatible with the PLUS 3 and Cumana disk interfaces.

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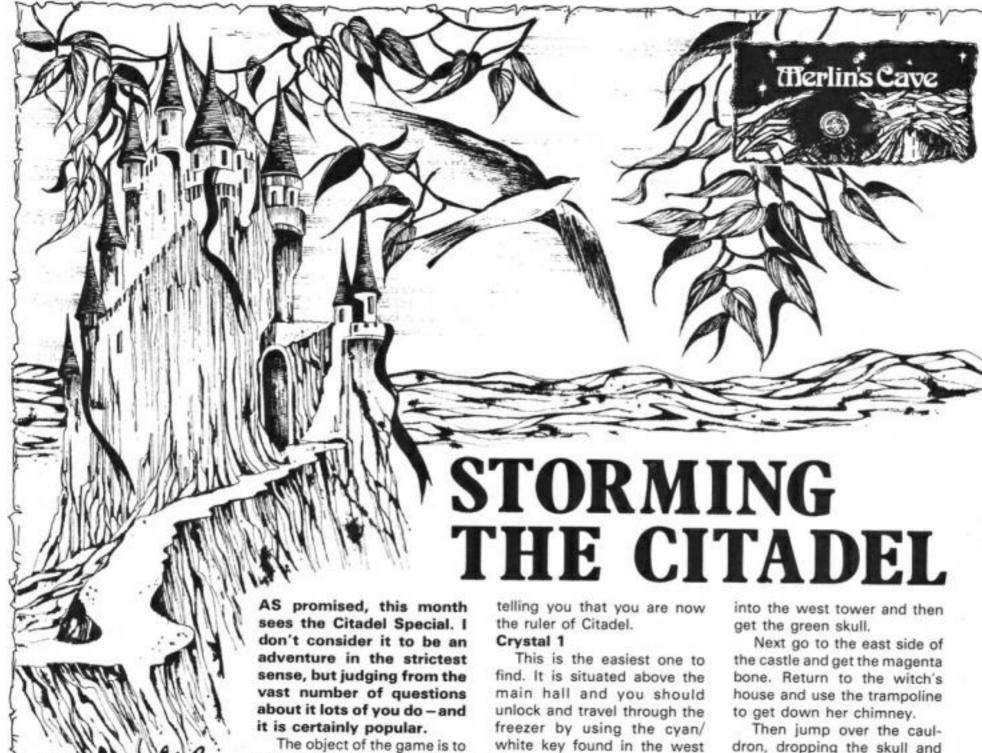
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collect five crystals. To do this you must solve a series of puzzles. There are also three crowns

to find. It is possible to complete the game without finding them, but if you do manage to find crowns plus crystals you get the maximum score of 99 and a message

white key found in the west wing.

Crystal 2

This can be found in the witch's house. You must get the trampoline from the west wing, drop it on to the red square next to the house and take the key that you now find

Use this to unlock the door

dron, dropping the skull and bone into it. Go and get the cyan bone from the pyramid and drop that into the cauldron

The witch will attack you but will explode when she reaches the cauldron, revealing an entrance that will lead you to the crystal.

Crystal 3

This is in the pyramid. Take the chicken and drop it in the kitchen. It will slowly turn red as it cooks.

Take it across the ocean and in to the temple and give it to the wolf guardians.

Now get the green man from the east side of the island. Return and, leaving the green man in a convenient location, collect the Egyptian masks from the well and the prison.

Take these to the pyramid and find the secret entrance at the top right hand side of the screen.

Drop the masks when you see the mummies and they will

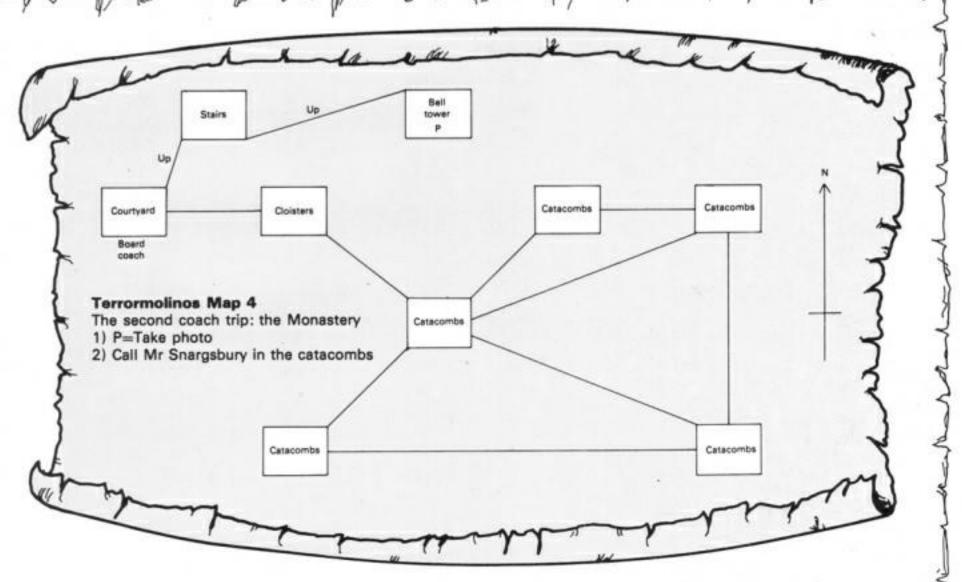
Now head for the bottom of the pyramid and climb on to the platform, taking the green

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Castle, The Hulk, Spiderman, Gremlins, Stolen Lamp, Sphinx Adventure, Savage Island 1, The Fantastic Four.

Geoff has also sent in three adventures that he has written using the Quill. He is considering marketing them and I would highly recommend them. Please contact Geoff at the above address for more information about them. And if you write to Geoff for help, please remember to enclose an SAE.



man with you and it will be turned into a crystal.

Crystal 4

This is in the laboratory underneath the well. Get the ice crystal from the cellar and go to the east tower.

The water will freeze over allowing you to cross and get the green/white key.

Use the key to get into the well wheel and pull the lever.

Now get the cannonball from the mountain and the gunpowder from the bag from the west wing, above the arena.

Go down into the well and to the lab. Walk over to the cannon and it will fire, revealing an entrance to another location. Enter here and get the crystal.

Crystal 5

Pull the lever in the top of castle location and then go on to the roof via the west tower.

A platform will now be moving up and down. Climb onto it and jump off to the right when it gets to the top.

You will enter the next screen and land high up on the central castle. Go in the door marked with a C and you will find the crystal.

The crowns

The first crown can be found in the well. Leave the ice crystal in the location that you found the Egyptian mask and go in to the room that is revealed to the right.

The second crown is in the witch's house. Enter it and go one location down.

Kill the monk and climb the ladder. Jump when you get to the top of the ladder, and once you start to move press the left movement key.

If you get the timing right a secret passage will be revealed leading to the crown.

The last crown is below the castle near the cellar. Go two locations to the left from the room where you found the ice crystal.

Use the trampoline to jump up and hit the roof, and after you have done so a few times start to move to the left.

Soon you will find you have uncovered yet another secret passage and have found the last crown.

The ice crystal

This is found in the cellar and freezes water, enabling you to stand on it. Use this to get the green/white key for the well wheel.

Also, if dropped at the very bottom of the well it will allow entry to the right to another part of the well where a crown can be found.

The cyan stones

If these are taken to Stonehenge you will be rewarded with large energy bonuses.

The barrel

When filled with water, from any source, it will allow

you to douse a fire.

This is mainly used to get past the fire in the east fireplace, allowing entry to the top of castle location. It can also be used to get on to the witch's house.

The chicken

When cooked in the kitchen the chicken will turn red. Taken to the temple, it will appease the wolf guardians, allowing you to enter the temple at any time.

Nothing!

Locations with nothing in them are handy for leaving your possessions.

Trampolines

Used to gain height and enable you to reach otherwise inaccessable locations.

Jewelled figure

If you drop the crystals in the location where you found the trampoline and then go under the radar dish to the starport you will be transported to the alien planet.

Taking the jewelled figure to the starport will destroy the transporter. Does anyone know why this needs to be done?

HALL OF FAME

Robin of Sherwood (continued) - Martin Hanson

Once you have found Siward, GET THIEF. Now wait somewhere along the serf's route through the forest and when he appears AMBUSH SERF. Then GO CART, WAIT, LEAVE CART. You are now inside the castle so GO BATTLEMENTS, GO DOOR, GO LEFT, DROP THIEF, and then KILL THIEF. EXAMINE CHEST three times, take what you find and then GO DOOR, GO RIGHT, GO WINDOW.

Sphinx Adventure (continued) - M. Alexander

E-S-D-N-E-CROSS BRIDGE-E-S-S-PAY TROLL-CROSS BRIDGE-W-S-S-TAKE SAPPHIRES-N-N-E-E -KILL OGRE-NO-SWORD-N-TAKE CUSHION-E-N-U -TAKE EMERALD-D-D-WAVE WAND-CROSS BRIDGE-DROP BOTTLE-DROP SILVER-DROP RUG-DROP OPALS-DROP CUSHION - DROP COINS - DROP CARROT - DROP BOOK - DROP EMERALD - CROSS BRIDGE - U-S-W-S-W-W-D-TAKE JACK - RUB RING.

Countdown to Doom (continued) - Craig Romans

To get the motor to the cargo hold from the rocky hole: PULL LEVER, U, SW, SE, W, N, SW. To get the reactor you must go

From Page 59

into the artifact and move along the corridor, remembering the order in which the shapes appear on the walls. Then push the niche.

After you fall GET PENTAGON, L, GET SQUARE, R, GET TRIANGLE, L, GET HEXAGON. Now you must find the room with the hole in the floor. Then GO DOWN, GET SWORD, E, GET REACTOR, W, N, SAY FLEZZ, N, NW.

Sadim Castle (continued) - The Raven

Mend the farmhouse roof and the farmer's wife will give you a pitcher. Give the pitcher to the monk and he will give you some keys.

Pray in the chapel and you can get the Bible. Use the Bible for protection against the mist. Read it when the mist forms, not when the howling starts. To get into the hunting lodge climb the great oak tree outside the lodge and use the gold key you find there to unlock the lodge door. Inside is a hunting knife. Use the knife to kill the cheetah.

To get the wheelbarrow through the undergrowth to the gardener go S-S-E-S-W-W-S-S-E-E-E-E-N-W-SW-S-S-S-S-W-E-E. Give the wheelbarrow to the gardener and you will receive an amulet.

To lower the drawbridge, ring the bell. To raise the portcullis insert the wooden stake from the crypt into the winch and wind it. You must have the amulet when you go through the portcullis or Lord Sadim will drop it on you.

Go in to the wood-panelled room and enter the inglenook fireplace. Climb up the chimney and then go along the passage. At the end is a room containing the bronze key which will unlock the trapdoor in the kitchen.

In the cellars/dungeons below the kitchen you will see Leonara beckoning to you. This is where you must dig with the pickaxe.

FEEDBACK

Geoff Larsen has written in with help for Linda Smith's problems in Ghost Town. Linda should ensure that she is wearing the silver spurs and then SAY GIDDY to make the horse move off.

To get to the mountains she should JUMP RIDGE. The safe must be opened with gunpowder, and don't be distracted by the violin strings.

To return from the canyon or tepee SAY HOW to the Indian ghost.

Geoff can also help with earlier problems: To avoid the gamekeeper in Ten Little Indians, go into the gatehouse up into the tower and tie the rope to an object you will find there. Then climb down the rope.

In The Wizard Akyrz Russell Blake should return the fox to its home and then FOLLOW FOX. Feed the chickens in the hen house to reveal a trap door.

In Gold Baton the oilsoaked rag should be SQUEEZED above the lamp. To get past the eerie figure WEAR CLOAK. If the matches get wet RUB RING and a genie will appear.

In Time Machine FEED BRONTOSAURUS with the biscuits. To solve the problem with the passage under the Sphinx go to the weapons room, PULL LEVER and then WEDGE (or JAM) LEVER. This stops it sliding back and reveals a hidden door.

To enter the maintenance wagon in Circus you need a bar. This is found after crossing the tightrope using the slippers found in the chest.

In Escape from Pulsar 7 there are two ways out of the first three locations, one of which isn't usable yet! You have to go through the air vent. This really is possible!

Apparently I muddled one of Geoff's answers in a previous Feedback. In Strange Odyssey, PULL ROD, RUB PLASTIC, PUSH ROD, RUB PLASTIC.

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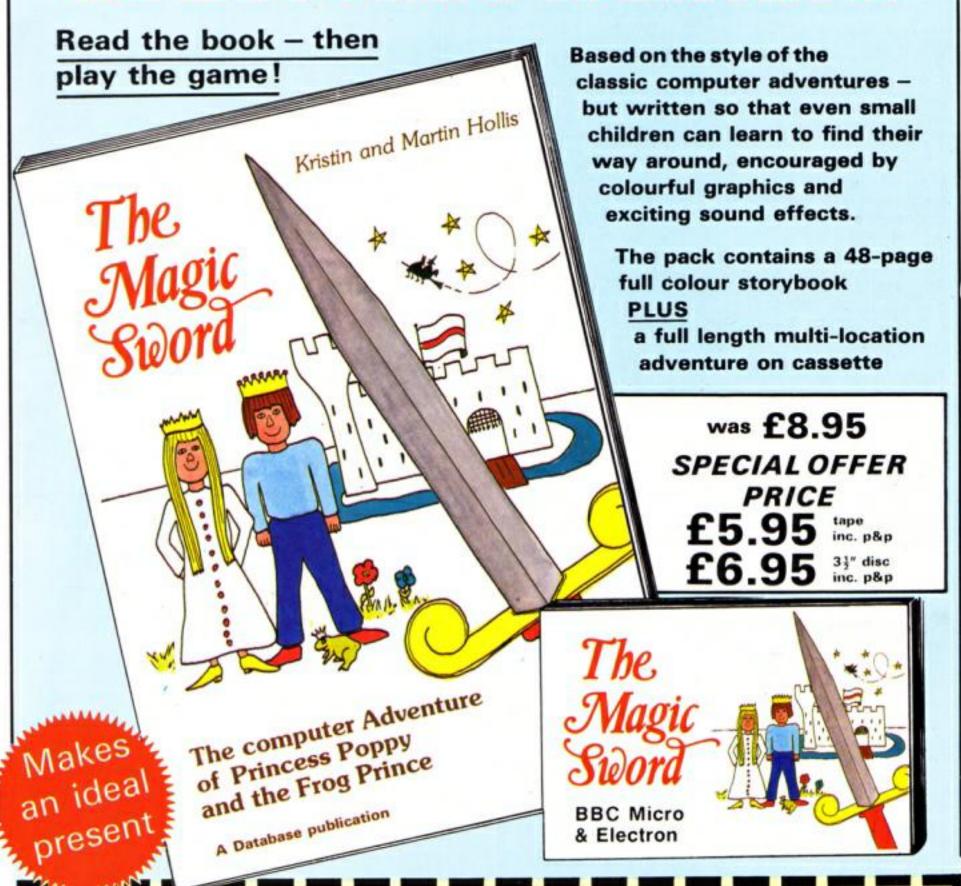
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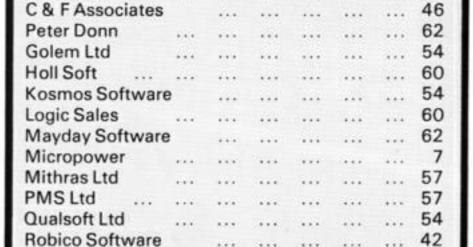
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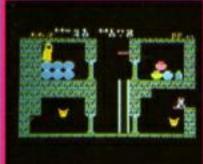
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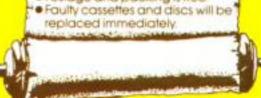
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